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WHERE THEOSOPHY AND SCIENCE MEET

Volume I, Parts 1 and 2

NATURE AND MAN

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H. P. BLAVATSKY

(12-8-1831 - 8-5-1891)

WHERE THEOSOPHY AND SCIENCE MEET

A STIMULUS TO MODERN THOUGHT

A COLLECTIVE WORK

762
EDITED BY

D. D. KANGA, I. E. S. (RETIRED)

*Managing Editor, Physical Science Section,
"Journal of the University of Bombay"*

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Vol. I

762

PART I: NATURE

FROM MACROCOSM TO MICROCOSM

Second Edition, Revised, Enlarged and Reset

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ADYAR, MADRAS, INDIA

"Virtuous, therefore, is the man who relieves the corporal wants of others, who wipes away the tear of sorrow, and gives agony repose; but more virtuous is he who, by disseminating wisdom, expels ignorance from the soul, and thus benefits the immortal part of man. For it may indeed be truly said, that he who has not even a knowledge of common things is a brute among men, that he who has an accurate knowledge of human concerns alone is a man among brutes; but that he who knows all that can be known by intellectual energy is a God among men".

("Proclus' Metaphysical Elements", translated from the original Greek by Thos. M. Johnson, Editor of "The Platonist".)

"Accept nothing that is unreasonable; discard nothing as unreasonable without proper examination".—BUDDHA.

"There is a principle, proof against all argument, a bar against all progress, and which if persisted in cannot but keep the mind in everlasting ignorance—and that is, contempt prior to examination".—PALEY.

FOREWORD¹

THE word *Theosophy* is by now well-known to the more instructed people in almost all the lands of the world. It occurs not infrequently in novels with the strangest connotations. Some, even in India, consider that Theosophy is some kind of a jumble of the ideas of all the religions; others that it is some kind of a psychic cult teaching Yoga; others still that it is some form of astrology plus psychism, etc. It is only those who really enquire who understand that Theosophy is a statement of the age-long enquiry into the problem of Truth in many past civilizations, as also the result of the enquiry of the members of the Theosophical Society since the Society started 73 years ago.

The word *Theosophy* was first used in the 3rd century A.D. by the Neo-Platonic philosopher Iamblichus as a general term for the mystical ideas in non-Greek religions. Later in European mystical writers it was used for various forms of thought that implied, directly or indirectly, that the nature of God existed within man also, that there is not an unbridgeable gap between the Divine Nature and that of man.

Theosophy, as understood by the modern Theosophist, means an enquiry into Truth in every department of existence. He tries to understand all possible processes visible and invisible that can be covered by the general term "evolution". Hence, while the Theosophist is keenly interested in the development of the soul of man towards incredibly high possibilities of expansion of consciousness, he is also keenly interested in atoms, electrons and the tiniest units of matter and force which modern science postulates. To the Theosophist, the whole Cosmos, visible and invisible, is an embodiment of a Divine Nature, and there is no point in space nor any particle of matter or life in which Divine Thought is not operative. Hence to the Theosophist the term "evolution" describes a cosmic process directed not by chance but by a Supreme Intelligence, whether we

¹ Written for the Second Edition of the book.—ED.

call that Intelligence by the name of God, Īshvara, Allah, or merely with the Buddhists the "Supreme Law".

The field of Theosophical studies has well been described in the two great volumes by Madame H. P. Blavatsky, *The Secret Doctrine*, as Cosmogogenesis and Anthropogenesis. In the same manner, in Volume I, Part I, of this work, the Editor has described it, "From Macrocosm to Microcosm". The two volumes (four parts) now published in a second and revised edition are merely an attempt to tell those interested in Theosophy, both within the Theosophical Society and without it, a few of the hundreds of subjects which are worthy of study. I hope the intelligent public who care to examine these four Parts will realize that Theosophy is not some kind of fancy religion created in the brain of Madame H. P. Blavatsky, who after all only stated to the modern Theosophists certain of the principles of the Ancient Wisdom.

We have some day to add to this series new volumes with titles, "Where Theosophy and Philosophy meet", "Where Theosophy and Education meet", "Where Theosophy and Art meet", and "Where Theosophy and Economics meet". Our work as Theosophists will then come nearer to our Objective.

C. JINARĀJADĀSA,

President,

The Theosophical Society, Adyar, Madras.

FOREWORD TO THE FIRST EDITION

I MOST heartily commend this book, compiled by writers learned both in Theosophy and in Science, and the result of Professor Kanga's trained enthusiasm for both, to all who really want to know what the world and the individual are about, who would discover Order, Law and Purpose in Life as they perceive it in themselves and in the world about them.

Theosophy is the experience of the greatly wise from time immemorial. Those who have restated the Science of Life for the examination of the modern world declare it to be the fruit of their own experience, however much the greater part of the experience must needs be beyond verification even by those deemed wisest by the consent of the majority of their fellows.

Thus is Theosophy the eternal mountain of experienced Truth. It is a mountain which all are climbing, some being here and some being there on the mountain side. Theosophy is a mountain of the universal Truth, fashioned out of the kingdoms of nature we know and out of those we do not yet know, fashioned out of the intimate lives of every citizen in these kingdoms, fashioned out of the lives of Gods, of men, of the whole of evolving Life from dwellers in valleys and in plains, from dwellers in the hills, to the Gods reigning on evolution's Olympian heights. Theosophy reveals the Thread of Immortality on which are strung these Beads of Living. Theosophy discloses the universal Law, the inexorable Purpose, the Divine Design, whereby all Life is moving, through an infinite series of Divine Events, the daily happenings in the lives of all, to that far-off Divine Event which shall be the climax, the triumph, the fulfilment, and verily the justification, for the æon-long way.

Science is busy in many fields seeking to understand this mountain of Truth, both as to its actual physical nature and in many other modes of its manifestation. Science is busy experiencing, seeking foothold after foothold for its upward climbing. Time was when all save perhaps the greater votaries of science ignored the mighty splendours of this Everest for the minutiae of the immediate fields of their endeavour. But in these days the spirit of the aeroplane dwells in man's conceiving no less than in his physical creation—indeed but for the conceiving elsewhere there could

have been no physical creation. And so it is that the thoughts and the dreams and the visions of man, and in particular of the scientist, soar high, and he bows as reverently before theory as he does before fact.

Theosophy still remains theory for him. But his science is also largely theory, and no less science for that. And thus Theosophy and Science are actually beginning to meet in the realms of theory, and even in the realms of so-called fact the statements of Theosophy are slowly beginning to find endorsement in the discoveries of Science.

In truth, of course, there is no distinction whatever between Theosophy and Science, only between Theosophy and what is called science. Theosophy is the experience of the Wise. What we call science is the convention of the learned, and all conventions come and go impermanent, as the more learned among the scientists, those who are beginning to be wise, are telling us with that humility which is always the beginning of wisdom.

Even, perhaps, the experience of the Wise is by no means final. Naught can be final to that which, however exalted, still is finite.

But Theosophy is at the very least a magnificently bold speculation, and since science is now holding speculation no less precious than experiment, the scientist who knows that dreaming is part of his scientific function may well make contact with a boldness which will carry him right out of himself, loosen him from all his present moorings, and plunge him for his exhilaration into the vastnesses of so far uncharted seas.

Let him ignore the statement that Theosophy is the experience of the Wise. But let him be inquiring even as to its apparent fantasies, for he himself is already in the realm of fantasy, and often the fantastic leads him to a truth. Already, I make bold to say, the scientist is dreaming Theosophy, and here and there is discovering that a dream comes true. Theosophy and Science are already meeting, both in that dreamland which is the most real land, and in this dreamland of ours which we think is fact-land. This admirable book tells us how this is so, and I commend it most earnestly to all who seek Truth everywhere, are happy to find it anywhere, and always hold it lightly, knowing that while Truth is everywhere, our understanding of it must ever be less than it really is.

George S. Curdale

PREFACE TO THE SECOND EDITION

THE aim of the book is to give in the modern scientific garb some of the great truths of the Ancient Wisdom and show how modern orthodox science is corroborating these truths in so many different directions and in such an ever-increasing measure.¹ The philosophy of the science of life is given in the first three parts showing that man is not body and mind alone but that he is a spirit, a fragment of the Divine, using both mind and body as his instruments. It further points out how the spirit descends into matter 'From Macrocosm to Microcosm' (Part I) and then ascends 'From Atom to Man' (Part II) and further ascends 'From Man to God' (Part III). The practical applications in daily life of this Ancient Wisdom of which Theosophy is the modern embodiment are given in Part IV entitled 'Some Practical Applications'.² In the second edition, some more subjects such as Food, Economics, Sociology, The Principles of Government, The Ministry of the Race, Self-Exploration, Self-Unfoldment, etc. are added.

* * * * *

Two World Wars in one generation and a possibility of a third, perhaps an Atomic Bomb war, more terrible and devastating than the first two, if we are not wise and vigilant enough to prevent it, show that the philosophy of Life which has guided man in his private conduct and politicians and statesmen in their public policies, is not complete and hence produces men and women with lop-sided development. This book is a humble attempt to give a more or less comprehensive view of the science of man as a complete integrated being, and present a more or less complete concept of man and the universe from many different angles. It pleads for a balanced view of life.³ It pleads for a New

¹ See "Scientific Corroborations of Theosophy", Part I.

² See the "Scheme of the Book", p. xxi, Vol. I.

³ See diagram 2, General Introduction, Vol. I.

Technique of Life, a New Variety of Discipline,¹ a New Type of Education,² (Part IV), which would give WHOLE MEN. It pleads for a Religion of Personal Experience³. It pleads for a happy and harmonious union of heart and head and hands, of goodness, intelligence and beauty, of humanities, sciences and arts. *Only whole men can save the world today.*⁴

The crisis through which the world is passing is due to a psychological dislocation, to a fundamental mal-adjustment resulting from a lack of perception of the essential values of life. What is wanted is a right adjustment.⁵ This means that Spirit should be given the highest place in the constitution of man, that spirit should be the ruler in man and mind and body serving as its tools which they really are. The effort should be towards a harmonious integration of all the three.⁶

The *new* technique is not an elaboration of the old which we are following at present. It is completely different. It is as different from the old as a motor car is from a carriage driven by a horse. This means that a complete overhauling of the old is needed. A re-valuation on the basis of the new philosophy and technique of life in all branches of life and in all human activities is necessary. A simple code of morality is not enough to produce men and women of noble character. There is no force behind it. It is ignored and broken if it clashes with personal interest. It needs to be supported by a valid philosophy of life and a training and discipline based on such a philosophy. Only then shall there be higher and spiritual values in life; only then shall there be a meaning and purpose in life; only then shall we have whole, cultured, noble people; only then, *with their help*, shall we be able to solve our complicated problems and resolve our present-day deadlocks.

"Humanity, the Great Orphan, has been, for weal or woe, catapulted into the 'Age of Atomic Power'. . . A New Age calls for new orientations, new institutions, new ideas and policies. But in order to be sane and constructive, we must start from the principle that man is the *primary factor* in the whole scheme, and that all else is incidental to man's evolution on this earth. Life then will have meaning and purpose. . . . Let us think of Theosophy as a dynamic philosophy of life

¹ See "Yoga", Part III, The Joy of Self-Unfoldment, Part IV.

² See *Education*, Part IV.

³ See *Modern Science and the Higher Self, The Thrill of Self-Exploration and Yoga*, Part III and *The Joy of Self-Unfoldment*, Part IV.

⁴ Dr. E. W. Sinnott: *Time*, p. 34, 27-10-1947.

⁵ Diagram 2, General Introduction, Vol. I, p. li, xxxv-liv.

⁶ General Introduction

intended to awaken the masses to an understanding that man is primarily a divine being".¹

Concordance

There are the following four copyright editions of *The Secret Doctrine* by H. P. Blavatsky :

First and Second Editions, 1888, Vol. I-II.

Third Edition, 1893, Vol. I-II ; 1897, Vol. III.

Fourth Edition (Adyar) 1938, Vol. 1-6.

The largest number of quotations given in the book are from the third edition, marked with an asterisk ; see p. . In order to facilitate reference to any one of these three editions, the corresponding pages of all the three editions are given side by side on p. under the title "Concordance".

Each article stands by itself. It is also related to other articles, as all articles together go to evolve a scheme of the drama of creation and evolution. The following articles may be read together with advantage :

An Epitome of Theosophy and Why Theosophy ?

Matter and the Atom, Chemistry, The Story of Atomic Energy, and A Note on Occult Chemistry.

Geology, Archaeology and Anthropology.

Evolutionary Biology, Anthropology.

Symbology and Mythology.

Physiology, Western Scientific Research and Etheric Double, Food, and Medicine.

Modern Science and The Higher Self, Psychology and Yoga.

The Thrill of Self-Exploration and The Joy of Self-Unfoldment, preceded by We and Our Food and Economics.

The Introductions in all the four Parts and the Epilogue.

The editor is very grateful to the following persons and institutions for their very kind help and collaboration in the preparation of the second edition of this book and tenders them his sincere thanks :

Mr. C. Jinarājadāsa for his kind guidance and inspiration throughout the progress of the book, for his Foreword to this edition, and for permission to use a number of diagrams.

¹ F. Arteshe : "Wake up to the New Age," *Theosophia*, Nov.-Dec. 1947.

The Theosophical Publishing Houses, Adyar and London, for permission to use a number of diagrams.

The T.P.H., Adyar, for the photograph of H. P. Blavatsky.

Dr. A. S. Kalapesi for diagrams 2-6 in Geology.

Mr. K. Srinivasan, Artist, Besant Theosophical School, Adyar, for diagram 1 in General Introduction.

His nephew Adi R. Kanga, B.Sc., B.E. for diagrams 3, 4, 30, 31 and 32 (Sec. Illustrations).

The American Geographical Society of New York for Diagram 4 (Archaeology), reproduced from the *Geographical Review* by the author. Sir Aurel Stein, Messrs. Macmillan and the High Commissioner for India, London, for diagram 5 (Archaeology).

The late Messrs. Conrad Woldringh and M. Harihara Iyer for a number of diagrams in the first edition reproduced in the second edition.

The Bombay University for the article "The Atomic Bomb : a Challenge to Man" (Part II).

The Authors of different monographs for their kind help and collaboration in this Collective Work.

Dr. G. Srinivasa Murti, Director, Adyar Library Association, for his keen interest in the preparation of the second edition of the book and for his guidance throughout.

Mr. C. Subbarayudu, Hon. Superintendent, Vasanta Press, Adyar, for all help and facilities given during the progress of printing.

Mrs. Parvati U. Sujan for the reading of proofs.

Mr. Henri van Zeyst for help in preparing the index.

The Authors and Publishers for quotations used from their books and journals.

FROM THE EDITOR'S PREFACE TO THE FIRST EDITION

THE labour of many an earnest student both of Theosophy and Science from different parts of the world has contributed to the production of this book. It is the fruit of a joint and co-operative endeavour. The monographs in the book are written in a popular form and should therefore appeal to a wider public.

The book draws pointed attention to the study of *man*, both from without by the ordinary scientific method of research and *from within by the occult method*. The *occult method* is merely an *extension of the scientific method*.¹ To be an occultist means to live rationally and not to go through life blindly. To be an occultist means to understand the mainsprings of our thoughts, feelings and actions and thus to live a fuller, richer and nobler life. It is worth noting that "there is an occult side to every act of daily life, and it often happens that if we know this occult side we can perform these daily actions more perfectly or more usefully".² There is nothing mysterious about occultism. "Occultism is the study of the hidden side of nature; or, rather, it is the study of the *whole* of nature, instead of only that small part of it which comes under the investigation of modern science".³ It should never be forgotten that the *ethical life* is always the foundation in all occultism. The talisman in occult life is a clean, loving, unselfish life of service and sacrifice. "Occultism—the study of Mind in Nature—is intended among other things, to make a man master of his various bodies physical, emotional and mental, etc., to make him understand the inner planes of his own being, the similar planes external to himself, and the relations between them".⁴ Every man is a potential occultist.

¹ See p. 2, second edition.

² C. W. Leadbeater, *The Hidden Side of Things*, p. 8.

³ *Ibid.*, p. 5.

⁴ C. W. Leadbeater.

See also "The Story of Atomic Energy," Part II, p. 318 on the difference between Occultism and Pseudo-Occultism. Also p. 15, Part I, this Series.—Ep.

The world is passing through a crisis. The knotty international problems of poverty, unemployment and war are defying solution. At such a juncture as this the point of view put forward in the book will, it is hoped, enable us to see the different problems in their proper perspective and to know where to look for their solution.

D. D. KANGA

PUBLISHERS' NOTE TO THE SECOND EDITION

THE first Edition of *WHERE THEOSOPHY AND SCIENCE MEET* had a good reception both in and outside India, notwithstanding the difficulties of transport and communications following immediately after its publication in 1938-39. It was evidently a timely publication with a method of presentation that seemed just right. Parts I and II were reprinted in 1943. Part III was also out of print and there was a demand for the book. The present edition is enlarged, recast, revised and brought to date as far as possible and contains a large number of additional illustrations. The book is now published in two volumes, Royal Octavo size, each volume containing two parts of the first edition. The book was considered to be a valuable contribution to Theosophical literature; and it is in recognition of this fact that the Editor has been the recipient of the Theosophical Society Subba Row Medal for 1939. Considering the difficult times through which the world is passing, the book will be found to be useful in suggesting solutions for a number of problems facing humanity at present.

G. SRINIVASA MURTI,
Director, The Adyar Library.

PUBLISHERS NOTE TO THE SECOND EDITION

The second edition of *Journal of the American Medical Association* is a revised and enlarged edition of the first edition. It contains all the material published in the first edition, with many new articles and a new section on "The Medical Profession." The new section contains a number of articles on the medical profession, including a special article on the medical profession in the United States. The new section is a valuable addition to the journal, and it is hoped that it will be of interest to the readers of the journal. The new section is a valuable addition to the journal, and it is hoped that it will be of interest to the readers of the journal.

Published by the
American Medical Association

PUBLISHERS' NOTE TO THE FIRST EDITION

It is with great pleasure that I have undertaken, on behalf of the Adyar Library, the publication of this book entitled WHERE THEOSOPHY AND SCIENCE MEET, A Stimulus to Modern Thought, edited by Professor D. D. Kanga. The book is the result of a joint and co-operative effort of a number of members of The Theosophical Society from different parts of the world, who have each written a monograph on some branch or branches of science and philosophy of which each has made a special study in the light of Theosophy with a view to correlate the two. Prof. Kanga has recently retired from the Indian Educational Service and come to stay at Adyar. He is still connected with the Bombay University, which is his Alma Mater, as a member of the Chemistry Editorial Board and the Managing Editor of the Physical Science section of the *Journal of the University of Bombay*. Being a keen student of both Theosophy and Science he is eminently fitted to undertake a work of this nature. As the sub-title indicates, it is the hope of the Editor that the book will act as a stimulus to modern thought and will particularly appeal to those who are intellectually discontented and anxious to find out the Truth for themselves and apply it to the solution of the many complicated problems facing society.

8-5-1938.

G. SRINIVASA MURTI,
Director, The Adyar Library.

PUBLISHERS' NOTE TO THE FIRST EDITION

It is a well-known fact that a book is not a mere collection of words and letters, but a living thing, which grows and develops as it is read. The publisher of a book is therefore not only responsible for the quality of the paper and the printing, but also for the selection of the material and the arrangement of the text. In the case of this book, the publisher has endeavored to select the best material available and to arrange it in a way that will be most helpful to the reader. The publisher also wishes to express his appreciation to the author for the valuable material which he has placed at the publisher's disposal. It is the publisher's hope that this book will be found to be a valuable addition to the reader's library.

G. B. Lippincott & Co.
Philadelphia, Pa.

THE SCHEME OF THE BOOK¹

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¹ These are tentative only.—Ed.

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¹ These are tentative only.—Ed.

CONTRIBUTORS

1. **Mr. A. Rangaswamy Aiyar, B.A., B.L.,** Advocate, Madura, India.
2. **Miss Margaret A. Anderson,** Member of the Theosophical Research Centre, London. Writer.
3. **Dr. G. S. Arundale, M.A., LL.B., F.R. Hist. S., D. Litt.,** President, The Theosophical Society, 1934-1945, Educationist, Lecturer, Author, Internationalist.
4. **Dr. B. L. Atreya, M.A., D. Litt.,** University Professor and Head of the Department of Philosophy, Psychology and Religion, The Hindu University, Banaras, India.
5. **Dr. M. Beddow Bayly, M.R.C.S. (England), L.R.C.P. (London).** Vice-President, Medical Practitioners' Union. Associate, British Faculty of Homœopathy. Lecturer, Author. Member of the Medical Group, the Theosophical Research Centre, London.
6. **Dr. L. J. Bendit, M.A., M.D., B. Chir. (Cantab.), M.R.C.S. (Eng.), L.R.C.P. (Lond.), D.P.M.,** Medical Psychologist, Lecturer, Author. Member of the Medical Group, the Theosophical Research Centre, London.
7. **Dr. Annie Besant,** President, The Theosophical Society, 1907-33. Reformer, Statesman, Author. One of the world's greatest orators.
8. **Mr. Claude Bragdon,** New York. Architect, Author of works on Art, Architecture and Occultism. Co-translator with Nicholas Bessarakhoff of Ouspensky's *Tertium Organum*.
9. **Dr. (Miss) Thérèse Brosse, M.D. (Paris),** on the staff of the Paris Hospital, expert in Cardiology. In 1935-36 toured India with a commission from the French Government to investigate physical reactions to states of consciousness in Yogis.
10. **Prof. Shyam Charan, M.A., M.Sc. (Lond.),** Late Head of the Department of Mathematics, Agra College, Agra, India.
11. **Mr. G. Nevin Drinkwater, B.Sc. (Lond.),** Diplômé of the Museums Association, England. Author of *Corroborations of Occult Archaeology*. Member of the Theosophical Research Centre, London.

12. **Mr. Peter Freeman**, Member of the House of Commons (Labour), 1929-31, 1945—. General Secretary of The Theosophical Society in Wales, from 1922 to 1943.
13. **Mr. Iwan A. Hawliczek, B.C., (Mathematics)**. Member of the Theosophical Research Centre, London. Joint Author with Prof. Marcault of "The Next Step in Evolution." Travelling Lecturer. Formerly Librarian, English Section, the Theosophical Society, England.
14. **Mr. C. J. Jayadev, M.A., L.T.**, Curator, Anthropological Section, Government Museum, Madras, India.
15. **Mr. C. Jinarajadasa, M.A., (Cantab.)** President, The Theosophical Society from 1945—. International Lecturer and Author, A great thinker and an inspiring teacher.
16. **Prof. D. D. Kanga, M.A., A.R.I.C., A.I.I.Sc., F.A.Sc., I.E.S., (Retd.)**. Editor-in-Charge of the Chemistry Editorial Board and Managing Editor of the Physical Science Section of the Journal of the University of Bombay. Editor, "Where Theosophy and Science Meet".
17. **Mr. R. D. Kanga, M.A.**, Ex-Secretary, The Bombay Electric Supply and Tramways Co. Ltd., Bombay.
18. **Mr. A. F. Knudsen**, Civil Engineer (M.I.T., Boston), Acting Principal, Brahma Vidya Ashrama, Adyar, 1928-29. Presidential Agent, Far East, 1936-1939. National Lecturer, American Section, 1900-1920; International Lecturer.
19. **Mr. Fritz Kunz, B.A.**, Author, National Lecturer, U.S.A.; Director of Research Seminars and Originator of Visual Education Service; Editor, "Main Currents in Modern Thought", N. Y.
20. **Mr. Charles E. Luntz**, Author; specializes in occult interpretation of the Bible and Esoteric Astrology; many years Lecturer on Theosophy in Central, Eastern and Southern States, U.S.A.
21. **Prof. J. Emile Marcault, M.A., LL.B.**, Scholar, Psychologist, Educationist, Professor of Psychology and French Literature, University of Claremont (1909-17), University of Pisa (Psychology) 1917-1924. Formerly, General Secretary of The Theosophical Society in France.
22. **Madame Marguerite Mertens-Stienon**, Theosophical Lecturer in England and abroad. Author of "Studies in Symbolism". Convener, Symbology Group, the Theosophical Research Centre, London.
23. **Prof. G. E. Monod-Herzen, D. Sc.**, Emeritus Professor of Physics, Faculty of Medicine, Kabul University, Afghanistan. Director, Centre d'Etudes Supérieures Indiennes, Pondicherry, India.

24. **Dr. Maria Montessori, M.A., D. Litt., F.E.I.S.,** an Educationist of International Reputation, Author of many books on Education. Originator of the Montessori System.
25. **Dr. Kewal Motwani, A.M., Ph. D.,** Author, Lecturer, a great exponent of sociological studies. Was invited to lecture on various phases of Indian civilization by over sixty universities and colleges of the U.S.A. between 1932-36. Formerly, Secretary, Sub-Committee on Science and its Social Relations of the Indian Science Congress, was deputed to lecture on Science and Society before the Indian Universities in 1944-5. Has lectured before various universities in Japan. Actively interested in the introduction of sociology in Indian education.
26. **Prof. T. Balakrishnan Nayar, M.A., (Madras) History and M.A., (London)** Archaeology, Professor of Indian History, Presidency College, Madras.
27. **Capt. A. G. Pape,** Author of "Is There a New Race Type?" Founding Fellow of the Anthropological Society of Scotland.
28. **Mr. James S. Perkins,** National President, the Theosophical Society in America, Artist. For many years an illustrative painter, illustrator, designer and advertising idea-man in Cincinnati, Ohio, travelled and lectured extensively in the U.S.A.
29. **Miss Edith F. Pinchin, M.R.S.T.,** Montessori Diplomée. Formerly, on the staff of the Besant Memorial School, Adyar, Member of the Theosophical Research Centre, London, Member of the Folk-Lore Society. Author of "The Bridge of the Gods", "A Study in Gaelic Mythology". Chief Knight for England of The Round Table for many years.
30. **Mr. Gaston Polak,** Civil Mining Engineer, Formerly General Secretary, The Theosophical Society, Belgium.
31. **Dr. D. H. Prins,** Editor and Writer, The Hague, Holland.
32. **Dr. Pieter K. Roest, Ph. D. (Chicago).** National Lecturer for The Theosophical Society in the United States of America since 1934.
33. **Srimathi Rukmini Devi,** President, Besant Centenary Trust; Director, Besant Theosophical School and the Arundale Montessori Training Centre; President, Kalakshetra (an International Cultural Centre), Adyar. President, World Federation of Young Theosophists, International Lecturer. A great Artist and inspiring Teacher. A great exponent of Bharata Natyam, the classical dance of India.
34. **Sri Swami Sivananda,** a spiritual Preceptor, Author, Lecturer; Founder-President, "Divine Life Society"; Editor, "The Divine Life"; Director, Sivananda Publishing League, Rishikesh, Himalayas.

35. **Miss Julia K. Sommer, B.Sc., (Chicago), M.A. (Columbia).** Formerly, Chairman, American Section of the Theosophical World University Movement, and of its Research Department. Late Editor, "Child Training in the Light of Theosophy". Lecturer and writer for the spread of ideas of progressive education.
36. **Mr. N. Sri Ram, B.A.,** International Lecturer, Editor. Intimately connected for many years with Dr. Annie Besant as her Private Secretary and Assistant Editor of her newspaper "New India". Vice-President of the Theosophical Society from 1942 to 1946. Holds many important offices in the Theosophical Movement.
37. **Dr. (Miss) Corona G. Trew, B.Sc., Ph. D. (London).** Member of the Theosophical Research Centre, London. Joint Author of "Studies in Evolutionary Psychology". Lecturer in Chemistry, Bedford College, London.

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12	40	78	371 f	398 f	87 f
15	43	79	460	497	180 f
18	45	82	477	518	200
29	59	93	477 f	517 f	199 f
62 ff	91 ff	131 ff	481	521	203
101	127	163	481	522	204
110 f	136	170	482	523	205
120	145	179	508	553	232
124	149	183	514	560	239
138	162	195	515	561	240
139	163	195	545	595	269
143	167	199	550	600	273
147	171	202	551	601	274
148 f	171 f	203 f	554	605	278
149 f	172 f	204 f	555	606	279
151	174	206	558	609	281
155	178	209	561	612	285
206	227	255	563	615	287
251 f	272	296	567 f	620	290
261	281	305	569	622	292
273 f	293 f	316	580	635	305
274	295	317	583 f	638	307 f
278 f	299	321	612	671	337
283	303	325	622	683	347
VOL. 2			VOL. II		
323	343	35	66 ff	69 ff	76 ff
339	362	53	69	72 f	78 f
359	384	74	149 f	158	157 f
			VOL. II		
			VOL. II		
			VOL. 3		

¹ *The Secret Doctrine Concordance*, by Arya Asanga, T.P.H., Adyar, 1940.

* See pp. xiii and xxxiv.

GENERAL INTRODUCTION TO THE
SECOND EDITION

GENERAL INTRODUCTION TO THE
SECOND EDITION

GENERAL INTRODUCTION TO THE SECOND EDITION

LINK BETWEEN TRUE METAPHYSIC AND SOUND PRACTICE

Unrest in the worlds political and social is due to unrest in the worlds religious and intellectual. Until man is at rest intellectually and spiritually, anchored on the rock of clear thinking and spiritual vision, the whole of his being must remain in a condition of unrest. Philosophy, Metaphysic, Religion—these are not unpractical and unreal, but are the most practical and most real things in life. For there is no reality to be found save in the profoundest depths of consciousness; there alone is the Real, there alone is the Eternal, and only for him who knows the Eternal and abides therein, only for him is there peace.'—(Annie Besant)

THE idea intended to convey through the above words of Dr. Besant may appear startling to some, unpractical to many, unintelligible to the large majority of unthinking people, unappealing to the casual readers, mysterious to a few, *but* to the earnest seekers after truth who are genuinely interested in the solution of the present-day complicated problems facing the world, they will appear as the distilled essence of a life-long experience of that great and mighty soul. Let us ponder over these words of wisdom and not pass by them flippantly. They contain and convey a world of meaning. They contain the germ of a solution of the deadlocks confronting the leaders of the different countries of the world.

* * * * *

We are living in a strange world. Science has given man tremendous power over the forces of nature¹ and so placed him in an enviable position in which he could enjoy peace, plenty and prosperity and have sufficient leisure to devote to his hobbies and follow his intellectual and spiritual pursuits and

Science (Knowledge) is Power

¹ *Introduction to the Science of Peace*, p. 2, by Annie Besant.

² Vide "Chemistry", *The Story of Atomic Energy*", and "The Atomic Bomb: A Challenge to Man", Part II, this series.—ED.

yet he finds himself embarrassed by, and frightened of, the same power, for he does not know how to use it. Science has given man more knowledge and power but has not shown him the way to wisdom, and power without wisdom is dangerous.¹ Science has helped man to conquer the (outer) world but has not yet taught him how to conquer the inner world.¹ Science has helped man to conquer so many external enemies, like fire, flood, pestilence and disease, which used to devastate millions but has not yet

But Power without
Wisdom is
Dangerous

helped him to conquer his selfish nature, his lust for power, his greed.¹ Science has enabled man to conquer nature and placed under his control tremendous forces which, if rightly used, would bring in a millennium but man has unfortunately proved himself unfit to make a good use of these priceless gifts. Science and engineering have given the machine to man but man, instead of becoming its master, has become its servant or rather its slave. Man does not know how to make use of the machine and power to secure more leisure for himself and utilize them for his own refinement and culture but instead has created for himself the most complicated problem of unemployment.²

Truly we are living in a paradoxical world. We have an army of unemployed and yet there is a dearth of skilled men. Science and engineering have helped us to produce foods and goods half a dozen or dozen times more than we used to do before and yet we have millions starving, half-clad and shelterless.² Science and engineering have helped us to overcome the difficulties of transportation and yet we allow our surplus foods to rot and not send them to places where people are dying for want of them.³ We have extended our powers of observation to stars and sub-atoms, to infinities, as it were, and yet we lack a wide vision ourselves, and our outlook on life is as narrow as that of a horse with blinkers on his eyes.

There is a beautiful Western mode of living of which we are really proud. But there is an undesirable side of this mode of living which is attracting large numbers of the peoples of the West, particularly those of the far West beyond the Atlantic. And the educated peoples of the East, a large majority

¹ Vide "The Thrill of Self-Exploration", Part III and "The Joy of Self-Unfoldment", Part IV, this series—ED.

² Vide "Economics—A New Outlook," Part IV, this series.—ED.

of them, *are not exempt from that kind of living*, for they too seem to be fascinated by it. What is this wrong side of the Western mode of living and what are its characteristics? In it the chief pleasure is found in the life of sensations and violent emotions directed by the lower mind. People do not find any pleasure in life, unless and until they get thrills (in life) and experience tremendous surges of emotions in life. So, naturally, they crave for change after change in the things which give them pleasure. Smoking, drinking, gambling and racing, new cinemas, new fashions in clothes, faster and faster rides, etc. They live mainly on the surface and are

Superficial Life not aware of the deeper layers of life to live and explore.

They are not happy at heart and have no peace of mind. They are restless. Though full of material possessions, they feel empty, for they are far away from the centre of their being where there is true bliss, peace and happiness. They have, as it were, conquered the whole world but lost their soul. In them, the centrifugal force is more active than

The Eternal in the
Midst of the
Fleeting

the centripetal; there is more rushing out to the circumference, to the surface, than trying to go nearer to the core of their being by penetrating through the surface to the deeper layers of their consciousness. How could they then have an idea of something unchangeable in the midst of the fleeting, of something more enduring than the things of the moment?

* * * * *

OUR GLORIOUS VIRILE TECHNOLOGICAL CIVILIZATION

We are genuinely proud of our glorious scientific, technological civilization which has given us the wireless, the radio and the cinema, the press, the telegraph and the telephone, the fast-moving ships, express trains and aeroplanes, which has conquered time and space and thus brought different parts of the country and different countries of the world nearer one another, which has given us means of control over pest and pestilence, drought and famine, which is capable of solving the question of production and transportation, and which could administer to our comforts and amenities in a thousand different ways, and the last and greatest of them all, control over atomic energy, which, if used for beneficent purposes, would bring about a revolution in our ways of living and our civilization.

And yet, taking into consideration the facts that the world has been passing through one crisis after another for the last so many years, that in spite of such splendid progress in science, engineering and technology we have not been able to solve the questions of poverty, unemployment and wars, it seems that there must be something radically wrong with this fine virile civilization. Our object is to point out some of the unpleasant features of our present civilization, from the dire effects of which the world has suffered terribly and is still suffering and which civilization has been described by discerning thoughtful people¹ both in the West and the East as crumbling and decaying and which the wise people of the world are thinking of abandoning and replacing by another, let us hope, a more enduring civilization built on more stable foundations.² It is, therefore, of the utmost importance to see that we plan wisely and well after mature thought and consideration of all the different factors. The following are some of the features of our present tottering civilization, which are also the causes of its failure³:

¹ "There was so much of *restlessness in the world*, so much of *disequilibrium*, so much of seeking after what people did not find, that people were perfectly convinced that a philosophy of life which depended on the continuity of existence, on the order of Dharma, on the inflexible rule of destiny, was the refuge and sanctuary of the soul. Therefore no Indian University, no depository of knowledge, could afford to ignore or eliminate that outlook on life which was India's heritage and which might be the world's salvation". (Sir C. P. Ramaswami Aiyar in a speech delivered on 30-11-1948 in Madras) (Editor's Italics)

² "The world influenced by the American and European civilization might be literally said to stand on tiptoe, from the psychological point of view, and was anxiously waiting for some message of deliverance or the 'way out'. *America was definitely in a condition of restlessness*. There was a feeling of disequilibrium and insecurity there. All the time they were wanting peace, but did not know how to get it". (Sir C. P. Ramaswami Aiyar : from a talk given at Kalakshetra, Adyar, Madras, on 15-12-1948)

³ Below are given some salient points from the address * which Pandit Jawaharlal Nehru gave on 3-1-'49 before the scientists, Indian and foreign, assembled at the thirty-sixth Session of the Indian Science Congress held at Allahabad. He said :

"... One thing which was agitating my mind was the present condition of the world. It was definitely going in a bad way and as scientists it became your duty to analyse the causes of this rot ... *I think with the advancement of science the balance of human mind was not advanced*. We still live in different grooves and think with a narrow outlook. The result is that the poise of the world is disturbed, putting it in a bad way. I feel it is your duty as scientists to see that along with advancement of science

* Reported in the press of 4-1-'49.

OUR PRESENT TOTTERING CIVILIZATION

Our modern civilization is a social structure raised by politicians, financiers and technologists. Our present civilization is materialistic, mechanistic, technological, commercial, political. *It is not based on an adequate knowledge regarding the true nature of man.* It has grown at random. It is based on a partial view of man, on an incomplete philosophy of life. It has not been built on the solid foundations of the understanding of the fundamental laws of life, and on the study of human relations.

We are at the beginning of a new era of Reconstruction. We are also living in an atomic age. Mighty forces of nature have come under the control of man. The question which we have to decide is whether the new civilization which we wish to build is to be of the same old pattern which has failed but now planned on a more elaborate scale, *OR*, whether we wish to break away completely from the old crumbling civilization and build a *New Civilization on a New Pattern.*

this balance or poise of mind also advances . . . *This balancing should be done in all spheres, economic, political, and even in the spirit of mankind.* The conflict of the spirit which has been generated due to this disturbance of the balance affects all and as scientists it becomes your duty to ponder over it and solve it and *bring back the lost balance . . .* What was troubling me today was the fundamental problem of the world. The world today in spite of great scientific achievements was in a bad way. They might call it *a crisis of the spirit of the world or might call it some kind of disjointedness.* It was obvious that the world was not right today . . . *Something was very wrong about. There were plenty of men of ability, talents and genius and still the world went wrong.* It was a question for every sincere thinking human being and obviously the scientists to find out why this state of affairs existed . . . If we look back upon ancient civilization we shall find that whatever the level of civilizations they had, there was a certain balance and poise in the individual. There was a certain fitting in with life, certain capacity to live one's life. Today the idea of living one's life was to run after pleasure . . . You should try to understand the complicated human phenomenon. You should think about this matter and try to help solve those problems by applying not only proper knowledge but looking at them *from a historical and human perspective and also by developing a philosopher's outlook.* A scientist minus philosophy was just a scientist and nothing more . . . Finally I appeal to you and the scientists all over the world to seriously consider as to *how science could help the world in the final analysis of things.*" (Editor's italics)

This whole book is an answer to Pandit Jawaharlal Nehru's challenge to the scientists given in the address quoted above.—ED.

The diagnosis of the root causes of the troubles from which the world is suffering is given distinctly and definitely in the quotation given in the beginning of this article by one of the world's greatest thinkers, teachers and practical social workers, Dr. Annie Besant. It is worth brooding over what she has stated there, particularly the remedy which she has suggested for the removal of unrest and the establishment of peace.¹ This introduction is a humble attempt at analysis and elaboration based on a personal conviction of the truth of the statement.

The crisis upon crisis through which the world has been passing since the beginning of World War I is due to the State-Chariot being driven by three horses of unequal strength proceeding with unequal speed. The first horse representing Science and Engineering is galloping, as it were, with the speed of an express train; the second horse representing Economics and Politics is jogging along with the speed of a bullock-cart; and, finally, the third horse representing Ethics and Spirituality is crawling with the slow pace of a snail. What is wanted is a uniform steady progress of all the three, so that the State-Chariot may run smoothly without danger of its being dashed to pieces. (See Diagram 1.)

Moreover, the present chaos and conflict in the world are due to *fundamental maladjustments* which, again, are due to a lack of perception of the essential values of life.

THE THREE VALUES OF LIFE²

There are three values in life which have a relation with man's constitution as shown below :

- (a) Material values represented by *Economics and Politics* which relate to the *Body* of man.
- (b) Intellectual values represented by *Science and Engineering* which relate to the *Mind* of man.
- (c) Spiritual values represented by *Ethics and Spirituality* which relate to the *Spirit* of man.

TWO FACTORS: SPEED AND POSITION

The maladjustments referred to above are due to two factors, speed and position. Scientifically expressed, the progress of society's chariot,

¹ The present-day thinkers are coming to the same view, see footnotes p. xxxviii and xxxix.

² Read "The Thrill of Self-Exploration", Part III, for the elucidation of this point.—ED.



DIAGRAM I

state chariot or world chariot is a function of (a) speed, and (b) position, of these three values.

FUNCTION OF		SPEED	RESULT
(i) Science and Engineering	...	Fast	} Unemployment
	Economics and Politics	...	Slow
(ii) Science and Engineering	...	Fast	} Misuse of
	Ethics and Spirituality	...	Slow
(iii) Science and Engineering	...	Fast	} (a) Destruction of
	Economics	...	Slow
	Ethics and Spirituality	...	Slow
			(b) Starvation in the midst of plenty.
(iv) Science and Engineering	...	Fast	} (a) Poverty
	Economics and Politics	...	Slow
	Ethics and Spirituality	...	Slow
			(b) Unemployment
			(c) Doles
			(d) Deadlocks
			(e) Wars

We thus see how the rapid advance of science and engineering without a corresponding advance in economics and politics, as well as ethics and spirituality has resulted in deadlocks and many complicated problems which face humanity at present and defy solution.¹

FUNCTION OF POSITION

Let us see how the other factor, namely, the difference in the *Position of importance* given to the same three categories—(a) Science and Engineering, (b) Economics and Politics and (c) Ethics and Spirituality, corresponding respectively to the three principles in man, namely, (a) Mind, (b) Body and (c) Spirit, also give rise to a large number of problems, individual, social, communal, national and international, which we are (too realistically) experiencing at the present day.

¹ See "Economics—A New Outlook", Part IV, this series.—ED.

The different permutations and combinations of two or three of them result in different situations which give rise to different problems. This will be a good subject for study by our psychologists and may lead to the solution of the many hitherto-supposed-to-be-insoluble problems. They may be graphically represented thus :

INDIVIDUAL AND WORLD PROBLEMS DUE TO FUNDAMENTAL MALADJUSTMENTS

	(Function of Position)	(Nos. 1, 2, 3, show positions of importance)
I	<ol style="list-style-type: none"> 1. Science and Engineering 2. Economics and Politics 3. Ethics and Spirituality 	<ol style="list-style-type: none"> ... (Mind) ... (Body) ... (Spirit)
II	<ol style="list-style-type: none"> 1. Science and Engineering 2. Ethics and Spirituality 3. Economics and Politics 	<ol style="list-style-type: none"> ... (Mind) ... (Spirit) ... (Body)
III	<ol style="list-style-type: none"> 1. Economics and Politics 2. Science and Engineering 3. Ethics and Spirituality 	<ol style="list-style-type: none"> ... (Body) ... (Mind) ... (Spirit)
IV	<ol style="list-style-type: none"> 1. Economics and Politics 2. Ethics and Spirituality 3. Science and Engineering 	<ol style="list-style-type: none"> ... (Body) ... (Spirit) ... (Mind)
V	<ol style="list-style-type: none"> 1. Ethics and Spirituality 2. Economics and Politics 3. Science and Engineering 	<ol style="list-style-type: none"> ... (Spirit) ... (Body) ... (Mind)

While there are so many maladjustments as shown above which prevailed in different times of History and in different countries and which obtain also at present (I to V and above), there is only one Right Adjustment, namely VI, given below :

THE RIGHT ADJUSTMENT

VI	<ol style="list-style-type: none"> 1. Ethics and Spirituality 2. Science and Engineering 3. Economics and Politics 	<ol style="list-style-type: none"> ... (Spirit) ... (Mind) ... (Body)
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which it should be our aim to reach and on which our New Age, our New World Order, our New Civilization should be founded. That will be a civilization built on solid rock which will never be shaken, for it will be built on the right triune concept of man as given to us by our sages and seers and prophets and also confirmed by our own experience, that man is a Spirit, a fragment of the divine, first and foremost, immortal, unborn and undying, using mind and body as his instruments, *where Spirit is the ruler* and not, as now, dominated by the mind or the needs of the body, as in I, II, III and IV. Our aim should be the development of individual uniqueness.

* * * * *

The present is a mind-dominated world. It is not necessary for us to go very far back in time to illustrate this state of affairs in the world. The conditions through which the world has passed since World War I and during the World War II and has been passing through even now after the end of World War II confirm this statement and is the best proof of its verification.

The Present is a
mind-dominated
World

"Everything in its right place and a place for everything".

"Everything in its own time and a time for everything".

A great sage has put this idea most clearly in the following words:

"The world stands at the threshold of a new era, a new departure, and at such a time, as ever before, the direction of the first steps determines the direction of the new departure. An error in the direction of the first steps affects the whole of the succeeding ones".

The Direction of
the First Step
Important

Giordano Bruno once said that if the first button of a coat is inserted in a wrong hole, then all the remaining buttons will be wrongly inserted. How very important it is to remember this graphic illustration when we are at the beginning of a new era of Reconstruction. It is also equally important to remember that to set right the wrongly-buttoned coat, we have to unbutton the coat completely and then rebutton it. Similarly, the present dislocated world situation can be set right only by a *complete overhauling*, and *readjusting* everything to the new concept in all departments of life.

Bruno's
Teaching

* * * * *

The present-day problems of poverty, unemployment, war, etc. cannot be solved by science and engineering alone, nor by economics and politics alone, nor by ethics and spirituality alone, but they could be solved by the combined help and co-operation of all three of them. But in the right ordering of society, the first place must be given to spiritual and ethical values, which would mean recognition of the unity of all life, respect for life, and mutual inter-dependence of life; the next, to intellectual values represented by science and engineering and the last though by no means to be underrated or minimized, to material values represented by economics and politics.

* * * *

One of the chief characteristics of the mind is to reason. Now "dethronement of reason" does not mean that we have not to use our mind or reason. It does not mean that we have "not to ask for proofs".¹ It does not mean belief without questioning or reasoning, or swallowing whatever is said or written as Gospel Truth. It does not mean any one of these things. *Reason and mind are of course to be used in all affairs of our everyday life. Let there be no misunderstanding on this point.* "Dethronement of reason" means only this: that, henceforward, reason which is an important characteristic of the mind will not occupy *the first place* in man's constitution; that its place is second, next to the man who uses reason². "*Dethronement of reason*" does not mean "*Dethronement of the Reasoner*". He who wills, reasons, thinks, sees, feels, hears, speaks, and acts—the doer,—is greater than the instrument or instruments he makes use of in his several activities in a work-a-day world. He is the Real Man, the Ruler.³

The above discussion, we hope, will not make us use our reason and our mind any the *less* in our everyday life. The gift of reason *is the greatest gift* given to man and it is that which distinguishes him from animals. Mind, like fire, is a good servant but a bad master. But in order to make the mind man's most precious possession and his best instrument for use in life, he must see that the mind is purified, under control, open and receptive, humble and unprejudiced. When there are no veils left between the mind and the problem facing it, when the mind becomes

¹ See p. 3, *The Social Function of Science*, by J. D. Bernal.

² See "The Thrill of Self-Exploration", Part III of this series—ED.

liberated from the prison of its self-created illusions, that is to say, when the mind becomes pure and unconditioned,¹ it becomes extraordinarily sensitive and receptive like a photographic plate and shows a new approach to the solution of all problems, individual, social, educational, political, economic, industrial, etc.

RESEARCH AND MORE RESEARCH

The above discussion again should not make us slow down the progress of science, engineering and technology as many monopolistic capitalists and industrialists wanted or would want the scientists to do,² or shut down the research laboratories and departments altogether or at least for a few years as was seriously proposed by many leading people³ when they saw the power given by science to man misused by him for his own selfish purposes, and as we see now, a similar proposal repeated in connection with the use of the atomic energy⁴. The true solution does not lie in that direction. We are 100 per cent for science and engineering; we are 100 percent for research, for exploration of new fields, not only physical but also biological, physiological, psychological and metapsychological. Research on human nature and human relations, on social structure and group behaviour. Research not only on the sciences of matter but also on the sciences of life and *man* himself, always taking life and man as a whole. We are 100 per cent for research and exploration, not only in the outer world but also in the inner unexplored worlds of one's own being.

¹ See diagram 2: also the monograph on *The Joy of Self-unfoldment*, Part IV of this series.—ED.

² See article on "Economics: A New Outlook", Part IV, this series—ED.

³ *Should Science be suppressed?*

"Voices have been raised—and raised in such an unexpected place as the British Association—for the suppression of science, or at least for the suppression of the application of its discoveries. The Bishop of Ripon preaching the British Association Sermon in 1927 said:

"... Dare I even suggest, at the risk of being lynched by some of my hearers, that the sum of human happiness outside scientific circles would not necessarily be reduced if for ten years every physical and chemical laboratory were closed and the patient and resourceful energy in them transferred to recovering the lost art of *getting on together* and finding the formula of making both ends meet in the scale of human life..."—From *The Times* of 5th September 1927, p. 15. Quoted from "The Social Function of Science", p. 2, by J. D. Bernal. (Editor's Italics) I should like to add the words *though different* after "together"; let the motto of every individual in society, in the words of Dr. G. S. Arundale, be **TOGETHER DIFFERENTLY**—ED.

⁴ (a) Read "The Atomic Bomb: A Challenge to Man", Part II—ED.

(b) Read also Editorial Note, *Nature*, August 30, 1947, pp. 273 and 74:

It speaks of "powerful 'anti-science' Groups even among some scholars and students expressing alarm at the march of science and *demanding the fettering of science and scientific workers*". (italics ours)

Research, more research and still more research. Research *without* and self-exploration *within* should be the very life and breath of every human being. And our attitude in all these researches must be *scientific* in the truest and widest sense of the word.

READJUSTMENT OF VALUES

When this is done, readjustment and assignment of right values will follow. Man will then begin to see things in their true perspective ; this will bring about a change in his psychological *level*, which will lead to a change of heart. And it is this change of heart and the consequent happy marriage between sciences and humanities, between head and heart, or, between knowledge and love, culminating in WISDOM which is so much needed in the solution of the many deadlocks confronting humanity at the present day. (See Pandit Jawaharlal Nehru's views on the necessity of the restoration of the lost balance, foot-note p. xxxviii-xxxix.)

DIALOGUE BETWEEN SUN AND SATAN

The particular note struck here is beautifully brought out in the episode described by Milton in "Paradise Lost". There is a dialogue between "Sun" as representing God, and "Satan", the second Archangel, who in his position and status, is second only to God. Imagine Sun (God) to be the Spirit in man and Satan (the second archangel) to be the Mind in man. Satan elated with success becomes proud and thinks himself to be the supreme ruler in the Universe. Sun says that God is supreme in the whole universe and that Satan's status is subordinate to God's. But Satan ignores God altogether or gives Him an inferior position and insists that he himself is the Ruler and King and therefore supreme. Sun says it cannot be and hurls Satan down to hell. Now Satan is not sorry to find himself in hell but is glad and says :

"Here we may reign secure, and in my choice

To reign is worth ambition though in hell :

Better to reign in hell, than serve in heav'n", (Bk. 1,1.261)
and so there he is.

Milton has put the whole thing in a nutshell. He says : Where mind is enthroned and spiritual values are ignored or thrown into the background there one cannot expect any other conditions but hellish.

Where first things are not put first, where Spirit is dethroned and mind which should occupy a second place is given the first place, there one cannot expect anything but moral and spiritual chaos and anarchy. All sense of values is lost. Hence, it is so very important to have a keen perception of the essential values of life. This alone will bring about right adjustment which will usher in a new age and a new order and in their train truth, justice, freedom, tolerance, peace, joy and happiness.

METAPHYSIC AND SOUND PRACTICE

"Thus closely linked are true metaphysic and sound practice. No practice is sound which is not based on true metaphysic. No metaphysic is true, that is, vital, which does not flower into sound practice. Both are necessary, if we are to unfold into perfection our divine nature".¹
(Annie Besant)

Dr. Annie Besant has brought out the view-point given above and at the beginning of this article still more clearly and emphatically in the passage given below :

What does the Liberation of Spiritual Forces Mean ?	"It is a very common blunder made by many people to suppose that spiritual forces have in them something which they are pleased to call <i>unpractical</i> , and we continually notice an assumption, which is taken for granted without argument, that if a nation, for instance, should turn itself towards a spiritual ideal, or if individuals should devote themselves to the spiritual life, that then such a nation is likely to be undistinguished along other more evident and visible walks in life, and such an individual is likely to lose much of what is called his practical value in the world. <i>Such a view of life is a blunder, and a blunder of the most complete kind.</i> The liberation of the spiritual forces, the setting free of energies on the spiritual plane, has a far greater effect both on the individual and on the nation in the other regions of its activity than can be produced by any of the forces that are started on the lower planes of life. . . . So that it is true in history, as you may find by study, that when spiritual forces are liberated the intellectual life of the nation will also leap forward with tremendous energy, the emotional life of the nation will show fresh development, and even on the lowest plane of all, the physical results will be brought about entirely beyond anything that could have been achieved by the energies of the physical plane which are set to work and which apparently cause these
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¹ Annie Besant : *An Introduction to the Science of Peace*, p. 53.

results. That is a principle, a law, that every force initiated on the higher planes, as it passes down to the lower, brings about results proportionate to itself ; so that it is the shortest-sighted view of human life and of human activity which imagines that devotion to the spiritual life, the evolution of the individual in the spiritual world, is anything but an immense addition to all the forces of progress that work on the earth, anything but a lifting up of the world on the great ladder up which it is climbing ".¹ (*Italics ours*).

Aldous Huxley comes to the same conclusion in his excellent, thought-provoking book, *Ends and Means* (p. 10), where he discusses the relation existing between the theories and the practices of reformers on the one hand and the nature of the universe on the other. "What sort of world is this, in which men aspire to good and yet so frequently achieve evil? What is the sense and point of the whole affair? What is man's place in it and how are his ideals, his system of values, related to

Our metaphysical
Beliefs, the final
Determining
Factor

the universe at large? *To the 'practical man' (these questions)² may seem irrelevant. But in fact they are not.*

It is in the light of our beliefs about the ultimate nature of reality that we formulate our conceptions of right or wrong ; and it is in the light of our conceptions of right and wrong that we frame our conduct, not only in the relations of private life, but also in the sphere of politics and economics. So far from being irrelevant, *our metaphysical beliefs are the finally determining factor in all our actions.*" (*Editor's Italics.*)

Man is a philosophizing animal, says modern science.³ Everyone of us is a metaphysician and a philosopher, whether we like it or not. Ideas rule the world. What we think, feel and desire, and how we behave depend upon our outlook on the nature of ourselves and the universe. The wider and deeper our outlook, and the more correct our thinking, our perspective and evaluation of life's events, the more rational our living. The deeper our understanding of the mainsprings of our thoughts, moods, emotions and actions, the fuller, richer and nobler our life.

Thoughts and institutions rule the world. But we should not forget that we are greater than our systems of thought and our institutions, for it is we who make the institutions, and create systems of thought.

¹ Annie Besant : *Evolution and Occultism*, pp. 181-2.

² Annie Besant : *An Introduction to the Science of Peace*, p. 53.

³ J. W. N. Sullivan, *Limitations of Science*, p. 194.

The world atmosphere is poisoned with thoughts of hatred, fear, mistrust and suspicion. It requires to be purified and charged with thoughts of love and understanding, justice and freedom. Only then will the world begin to breathe normally and freely. How this can be done is shown herein.

* * * * *

A mere intellectual satisfaction at finding out the causes of the deadlocks and knotty problems which face us and the discovery of the key to the solution of life's problems and riddles is not enough. *We must put this knowledge into practice* by actually facing these problems and trying to solve them and not by running away from them. *We must be daring and courageous in the search of Truth.*¹ *Let our motto be : Dare, Seek, Find, Share.*

To Summarize :

An impartial survey of the happenings in the world shows that there are deadlocks in human affairs, that the world is all in confusion and travail, that it is full of violence, injustice, unwisdom and folly, that the physical poverty of the masses is due to the intellectual, moral and spiritual poverty of the classes. Such a state implies that there is bankruptcy of thought in every department of life. Bankruptcy of thought and poverty of spirit imply that the present-day secular and religious training and discipline have more or less failed us ; they are not enough.² They require therefore to be *supplemented* by another kind of training and discipline. This means that a new technique of life is needed ; a new instrument is needed ; a new type of men and women are needed to resolve the present-day deadlocks.

The old techniques have failed to solve our problems because they have not the power to refine and ennoble man, being based on an incomplete concept of man as if he was mere body and mind, or, rather, body and brain. Administrators, statesmen, politicians, economists, industrialists, educationists, social reformers, etc. have all based their policies on this partial view of man, this dual, therefore incomplete, concept of man and incomplete philosophy of life. Hence they are not able to resolve the present-day deadlocks.

¹ Vide " The Thrill of Self-Exploration ", Part III, this series.—ED.

² Vide " The Thrill of Self-Exploration " and " Yoga ", Part III, this series.—ED.

We have now come to learn, or rather, we are driven to the conclusion that science alone, knowledge alone, brains alone are not enough to solve our problems. We have further come to learn that *along with science*, a spiritual background is necessary for the solution of our problems. It is because we are lacking in many spiritual qualities that we are not able to solve our problems and resolve our deadlocks in spite of all the knowledge that we have on the subject. A change in our psychological level, in our mental outlook and attitude, and a change of heart are needed if at all we want to resolve our deadlocks.

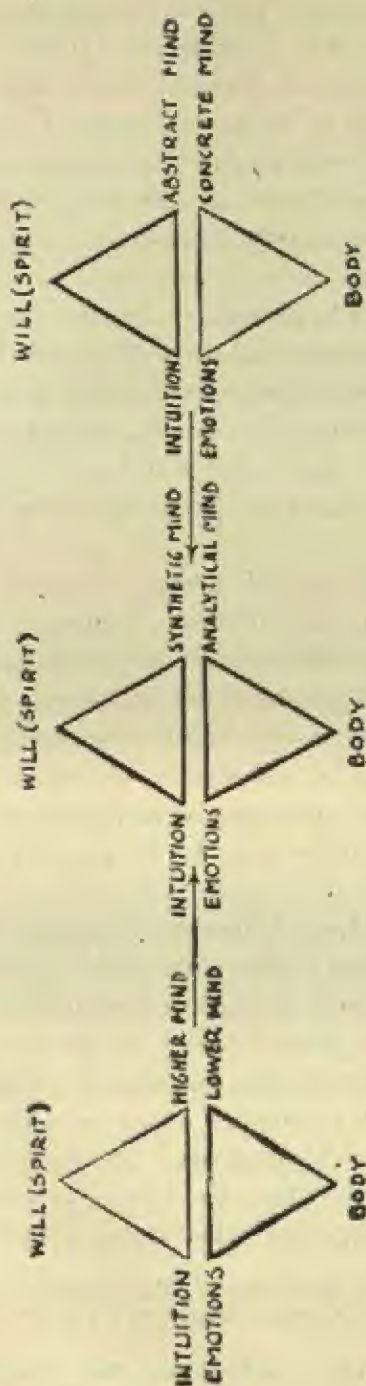
In order to bring into existence a better and a happier world, what is wanted now is not so much faster trains, faster automobiles, faster oilships, faster aeroplanes, or new *external* instruments of whatever kind, as a new mental outlook, a new technique of life, a new *inner* instrument—an instrument which we have to build within ourselves. In fine, we have so to live our life and mould our bodies that we have to transform ourselves into strong, healthy, virile, resilient, responsive, loving, intelligent, beneficent instruments, or rather, forces for efficient work on the physical and other planes of existence.

A new technique of life, a change on the psychological level, a change of heart—all these imply that we must live not only the life of the body, senses, emotions, and lower, concrete, analytical mind, *but also the life of the higher, abstract, synthetic mind which is a part of the spiritual triad*. So it means that we must *combine* the physical and the physiological life, that is, the material and the worldly life with the life of the higher mental and the spiritual. It means that we now resolve to live a *whole* life and not a partial life and that we assign right values to spirit, mind and body. (See diagram 2). Only then shall we be able to manifest those beautiful qualities in our character and become truly cultured and refined people.

Hitherto, *the lower, analytical mind was the ruler in us* because we did not know that we were more than body and mind (brain). Now we are beginning to learn that the reality in us is the Spirit, that *we are the Spirit* and that mind and body are the instruments of the spirit.¹ What is really wanted is a proper sense of values, a due sense of proportion. *The life of the lower triangle, that is, the life of the*

¹ Vide "The Thrill of Self-Exploration" and "Yoga", Part III.

CULTURE



INCOMPLETE
CONCEPT
LOP-SIDED
DEVELOPMENT

COMPLETE
CONCEPT
ALL-ROUND
DEVELOPMENT

INCOMPLETE
CONCEPT
LOP-SIDED
DEVELOPMENT

"WHOLENESS IS HOLINESS,"
NOBILITY, REFINEMENT,

BROTHERHOOD

DIAGRAM 2

body, emotion and lower mind, is not to be ignored (see diagram 2) but we should see that it occupies a proper place in the scheme of things, and its proper place is subordinate to that of the Spiritual Triad.

If the two triangles in diagram 2, material (lower) and spiritual (upper), are placed as shown in diagram 3 to represent two wings of a bird—the bird of progress and civilization—then it is self-evident that the bird will have a smooth, fast, delightful and glorious flight only if its two wings are *equally strong and healthy*. If either of the wings is weak then it will not be able to fly smoothly, or its flight will be retarded, or stopped altogether. The illustration clearly recognizes the importance of both the material and spiritual parts of the individual and emphasizes the necessity and wisdom of their *simultaneous* development. Only then shall we have a new type of people, cultured, refined and noble.

The quotation given below from the translator's preface to *The Secret of the Golden Flower* also lays stress on a due sense of proportion between the two values.

"Mastery of the inner world, with a relative contempt for the outer, must inevitably lead to great catastrophes. Mastery of the outer world, to the exclusion of the inner, delivers us over to demonic forces of the latter and keeps us barbaric despite all outward forms of culture. The solution cannot be found either in deriding Eastern spirituality as impotent, or by mistrusting science as a destroyer of humanity. We have to see that the spirit must lean on science as its guide in the world of reality, and that science must turn to the spirit for the meaning of life".¹

* * * * *

The prophet of ancient Iran, Lord Zoroaster, calls man "Urvān" which literally means "The Chooser".² Just because man is man, a human being as distinguished from an animal, he has the perfect liberty of choice. This is the great charter of spiritual liberty, the freedom of thought, the freedom to think, decide and act for himself, which was proclaimed by Zoroaster for mankind thousands of years ago. Zoroaster recognized the dignity of the human person. He also speaks of two paths, the right and the wrong, and points out what the consequences of

¹ *The Secret of the Golden Flower*, (A Chinese Book of Life) translated and explained by Richard Wilhelm with a commentary by C. C. Jung. The above is a quotation from the Translator's preface.

² Dr. Irach J. S. Taraporewala calls "Urvān", the Principle in Man, "the Chooser"; T., April 1936, p. 22.

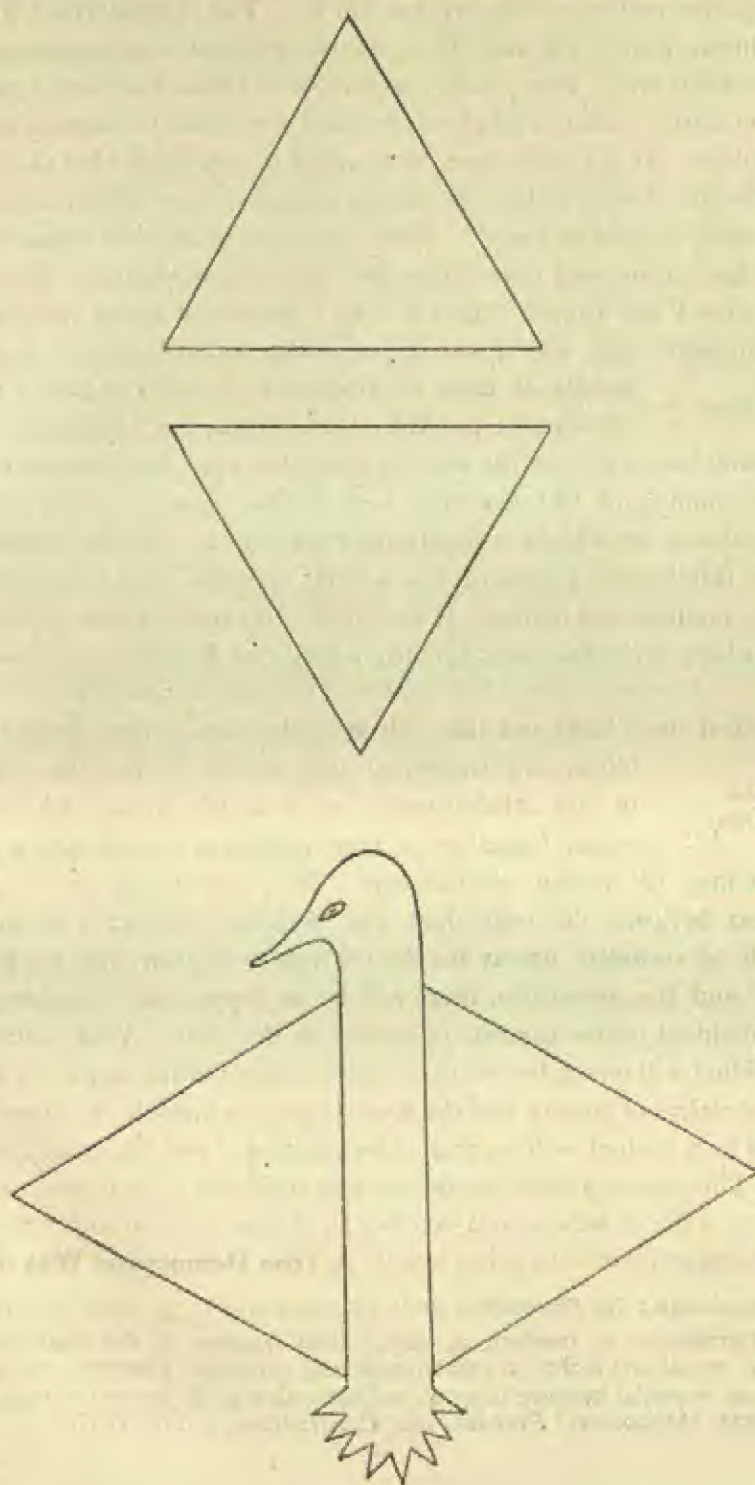


DIAGRAM 3

following these two respective paths would be. The righteous path will lead to happiness, peace, joy and bliss; the unrighteous to unhappiness, pain, misery and suffering. There is no *compulsion* to follow the former path and avoid the latter. Man is left free to choose for himself whatever path he likes to follow. At the same time, he is asked to remember that the responsibility for his choice is his. He cannot escape the law which says: "As a man sows, so does he reap". This law holds good in all kingdoms, not only in agriculture and horticulture but also in homoculture. By sowing seeds of hatred man cannot expect to reap a harvest of loving relationships.

Zoroaster lays very great stress on law which he says is just. He speaks of Law as God and of God as Law. God is omnipotent but He is not arbitrary or whimsical. Even the Cosmic Logos follows the law for He is the very embodiment of Law. An understanding of this law may help to solve many puzzling problems which confront individuals severally and humanity as a whole, which baffle even the intellectual giants of the world: namely, how to reconcile the goodness, justness and holiness of God with the various kinds of evil, baseness, injustice, wickedness and tyranny which one discerns in the world.¹

When these ideas and those given in the various monographs which follow are translated into practical life, they will result in the establishment of a stable social and economic order, based on a true philosophy of life and a correct understanding of human relationship. This will bring about a right adjustment between the individual and society. In such a social order, there will be complete liberty for the individual to grow with his personal initiative and free enterprise, there will be no suppression or submergence of the individual in the interests of society or the state. At the same time, the individual will remember his duties and responsibilities to society and the legitimate claims of society and the state, if any, on himself. In other words, there will be a mutual, willing and understanding, 'give and take', between the two. This means a life of awareness and vigilance, a life of discipline and orderliness, a life of service and sacrifice, a change of heart and a change on the psychological level—in other words, **A True Democratic Way of Life.**²

¹ Taraporewala: *The Five-pointed Star of Zarathustra*, T., pp. 19-24, April 1936.

² "Democracy is freedom in action and freedom is the guarantee of spiritual, social and technical creativeness and advance. Freedom and democracy are essential because they are indispensable to all aspects of culture". (Branislaw Malinowski: *Freedom and Civilization*, p. 316, 1947.)

PART I: NATURE
FROM MACROCOSM TO MICROCOSM

“Theosophy may be described to the outside world as an intelligent theory of the universe. Yet for those who have studied, it is not theory, but fact ; for it is a definite science, capable of being studied, and its teachings are verifiable by investigation and experiment for those who are willing to take the trouble to qualify themselves for such enquiry. It is a statement of the great facts of Nature so far as they are known—an outline of the scheme of one corner of the universe.” . . .

An Outline of Theosophy

by C. W. LEADBEATER

A STIMULUS TO MODERN THOUGHT¹

It may appear strange, but is nevertheless true, that a number of statements regarding Man and Nature made some years ago in the classic literature of Theosophy and the Ancient Wisdom are now, year after year, being corroborated by Science². Thus Theosophy finds in Modern Science a great ally, which supports in an ever-growing measure the truths given in theosophical literature.

Modern Science
an Ally of
Theosophy

We have deep respect and veneration for the great scientists who have brought us the new knowledge and consequently a new outlook on life by giving a new orientation to scientific thought. We yield to none in our admiration of the scientific method which is so thorough and so exact. We fully appreciate what the scientists have so far been able to do by means of the scientific method, the value of which all the world acknowledges.

Appreciation of
Science

But if it is true that a large number of recent scientific discoveries have been anticipated in so many directions by the Ancient Wisdom, which Theosophy embodies; or, as Sir Oliver Lodge has put it, that modern science is rediscovering some of the truths of ancient science; or, again, in the words of Professor Soddy, that we are treading today the road which the ancients trod in the unrecorded history of the world,³ then there must be another method of investigation of which the Ancient Wisdom was the result, and it would be pertinent to inquire what that method is and who are the persons who use it. The method by which the truths given out in the Ancient Wisdom were discovered, is known as the Occult

Methods of
Research
Compared

The Occult
Method

¹ This article may be considered to be an Introduction to Vol. I of the Second Edition. It is written by combining the Introductions to Parts I and II of the First Edition, with some rearrangements and additions.—Ed.

² *Scientific Corroborations of Theosophy*, this Part, and other monographs (see Scheme).

³ Frederick Soddy, *The Interpretation of Radium*, Ch. XI.

Method, and those who use it are known as occultists, seers and sages, for they possess powers of which present-day science is just beginning to be aware. This shows that *the orthodox scientific method is not the only method for the discovery of Truth*. There may be other methods of investigation and the occult method is one of them.

This occult method is not contradictory but supplementary to, or an *extension*¹ of, the scientific method, and superior to it inasmuch as,

first, it is more comprehensive than the scientific method, *having a wider range of data from which to draw inferences*, for, in addition to scientific data it includes also data obtained by clairvoyant research—and clairvoyance is now recognized as a fact in nature ;²

secondly, it collects its data by actually seeing the inner working of the phenomena in their *normal* condition and not by the observation of their external behaviour under *excited* conditions of experiment, as is done by science ;³

thirdly, the occult method is helpful in the investigation of subtler forces and subtler worlds, whereas the orthodox scientific method is found to be inadequate here simply because these subtler forces and subtler worlds do not respond to the apparatus of the orthodox scientists, however complicated, powerful or delicate it may be ;⁴ and

fourthly, it can survey a long stretch of time extending over tens of thousands of years, clairvoyant observations of which have been made by a very large number of seers and sages of the past.

These observations were classified and inferences drawn therefrom ; these inferences were tested and either modified, amplified or rejected ; those which stood the test were checked and verified over and over and over again in the light of further observations. Time has been one of the great assets of the occult researchers, and the strictly scientific method of investigation which they followed has been another.⁵ A number of statements given in recent theosophical literature and confirmed by science

¹ Extension, because of the extension of the senses of man, clairvoyance, clairaudience, etc.

² Monographs on *Archaeology and Psychic Research* (see Scheme).

³ See *A Note on Occult Chemistry*, Part II, this Series.

⁴ *Current Science*, January 1938, p. 340, Presidential Address by (the late) Lord Rutherford on *Transmutation of Matter*. Vide *infra*, p. 7.

Vide also " Conclusion " in the monograph on *Chemistry*, Part II, this Series.

⁵ Monographs on *Theosophy and Modern Science* and *Whither Science* (see Scheme).

are the results of *independent* clairvoyant researches of Dr. Annie Besant and C. W. Leadbeater.¹

In view of what has been stated above, the discussion in *Nature* which began with the article by Dr. Dingle on "Modern Aristotelianism",² the letters by different scientists which appeared in reply to this article under the title "Physical Science and Philosophy", and Dr. Dingle's counter-reply to these letters under the heading "Deductive and Inductive Methods in Science",³ were opportune and illuminating. It was a discussion in which the intellectual giants of the day took part, many of them being Fellows of the Royal Society. Dr. Dingle favoured the strict inductive method for the discovery of truth about Nature. He "inveighed against a new departure in scientific method (followed by Sir Arthur Eddington and others) which had grown out of the revolution of thought provoked by relativity theory."

"The question", in his words, was "whether we could discover the truth about Nature rationally without recourse to experience." He was against the metaphysical line of attack on physical problems. The discussion "raised the matter of the curious relationship which at present subsists between metaphysics and science."

We are of the opinion that this new departure in scientific method is inevitable as a result of evolution in the consciousness of man. The gradual evolution of physics into metaphysics and of metaphysics into occultism, is bound to take place in the case of some few people who are so constituted

Physical Science
and Philosophy

From Physics to
Metaphysics

¹ "Theosophy may be described to the outside world as an intelligent theory of the universe. Yet for those who have studied, it is not theory, but fact; for it is a definite science, capable of being studied, and its teachings are verifiable by investigation and experiment for those who are willing to take the trouble to qualify themselves for such enquiry. It is a statement of the great facts of Nature so far as they are known—an outline of the scheme of one corner of the universe." . . . "The men who fully know—those who are called adepts—have patiently developed within themselves the powers necessary for perfect observation. For in this respect there is a difference between the methods of occult investigation and those of the more modern form of science; this latter devotes all its energy to the improvement of its instruments, while the former aims rather at the development of the observer." . . . "To remember that I am not putting this forward as a theory—as a metaphysical speculation or a pious opinion of my own—but as a definite scientific fact proved and examined over and over again." (*An Outline of Theosophy*, by C. W. Leadbeater, Second Edition, pp. 2 and 5.)

² *Nature*, May 8, 1937, p. 784.

³ *Nature*, June 12, 1937, pp. 997 to 1,012.

that they are more susceptible to discover truth, first, by pure reason and later by intuition. In the light which Theosophy sheds on the constitution of man and his intellectual evolution, from the analytical mind stage to that of the synthetic mind, and then to the stage beyond the mind, all the three methods of investigation, namely, the inductive, the metaphysical and the occult, take their rightful places, so that the present metaphysical phase we are witnessing is a necessary stage in the evolution of the scientific method. Each method is important and great in its own way. However much the new departure in the scientific method may be criticized, it is bound to spread more and more as time goes on and as the new type of men and women are born in greater numbers in the world, for the Next Step in Evolution is the development of the subtler senses, the awakening of the intuitive faculty. Sullivan ends his chapter in "*Limitations of Science*" with the following words:

"We conclude, therefore, that the truly significant change in modern science is not to be found in its increased powers to aid man's progress, but in the change in its metaphysical foundations."¹

Just as the metaphysical method of research is a necessary phase in the evolution of scientific research, so was the materialism of the nineteenth century a necessary stage in the evolution of scientific thought. Similarly, the findings of modern science and the philosophic beliefs of some great men of science, such as Sir James Jeans, Sir Arthur Eddington, Professor Millikan, General Smuts, to mention only a few, are a departure from the materialism and strict determinism of the last century and a further evolution in scientific thought. It is now recognized that there is Order and Intelligence in Nature, that there is a Plan, and that Plan is Evolution, that evolution is not, as was hitherto supposed, "the result of a fortuitous concourse of atoms", but that there is mathematical precision, ordered harmony and a great design and consequently a Purposive and Directive Mind behind the great drama of creation and evolution.²

Though this picture of Man and the Universe of modern science approaches to some extent that given in theosophical literature, yet it is a very feeble reflection of the grand scheme of cosmogenesis and anthropogenesis given therein. If a part

Pictures of Man
and the Universe

Order and
Intelligence
in Nature

Take it as a Work-
ing Hypothesis

¹ T. W. N. Sullivan, *Limitations of Science*, p. 196.

² *The Great Design* edited by Frances Mason.

of the design of the picture of the creation of man and cosmos as given by Theosophy is in agreement with the latest picture-design—as given by science, then it is possible that the rest of the design of the theosophic picture may also be true, and it is therefore worthwhile for the scientists to know what that whole picture is and to take that *as a working hypothesis*, for who knows it may prove a good guide and helpmate in their further investigations.

We very well realize the difficulties which many of the materialistic scientists and philosophers of more than a generation ago experienced in grasping the teachings of Theosophy, for in the first place they supposed Theosophy to be nothing but mere speculations of the ancients, and confounded it with orthodox religions; secondly, they were obsessed with the mistaken idea of the human race being only a few hundred thousand years old or a million years or so at most; thirdly, they had no adequate knowledge of the past history of the earth and man, or of the existence of the mighty civilizations of old and of the history of their rise and fall, etc.

Thanks to the admirable courage shown by Madame Blavatsky in putting forth views which were in advance¹ of those held by “nineteenth century orthodox science steeped in materialism, orthodox philosophy submerged in classicism, and orthodox religions soaked in superstition and distorted by the slavish following of outworn dogmas and soulless traditions”;²

thanks again to the pointed attention drawn by her to the great antiquity of man,³ the greater antiquity of the earth,³ the existence of great ancient civilizations,³ of archaic knowledge, of the living Adepts in possession of this knowledge and the possibility of coming in contact with Them, the Inner Government of the World by an Occult Hierarchy, etc.

thanks once again to her proclamation of the main ideas of the philosophy of Ancient Wisdom, namely, reincarnation, karma (the law

¹ “It is impossible not to feel the greatest respect for Madame Blavatsky's writings on this subject (What is the Soul?); of respect, and if the word be permitted, of admiration, writing when she did, she anticipated many ideas which, familiar today, were in the highest degree novel fifty years ago.” (From an article by Prof. C. E. M. Joad on “What is the Soul?” in *The Aryan Path*, May 1937).

² *Current Science*, p. 321, January 1938.

³ See *Geology and Archaeology* this Part, *A Note on the Origin of man and Anthropology* Part III.

of action and reaction), man's invisible bodies, the possibility of communication between the visible and the invisible worlds ;

thanks once more to the valuable researches of modern scholars and scientists and their corroborations of many of the statements made in 1888 by Madame Blavatsky in her monumental work, *The Secret Doctrine*, and other classic literature of Theosophy—

thanks to all these that the present generation of scientists and philosophers have begun to see things in their proper perspective.

If once the fact is recognized and grasped that what is known as
Plan of Evolution
Theosophy is not a figment of the imagination or the speculations of the ancients, but that it is the accumulated wisdom of ages arrived at by the occult method—a method worthy of study and investigation as the times are now ripe—then it will be realized that the study and knowledge of the whole Plan of Evolution as given in Theosophy, beginning with the dim past millions of years ago and stretching far into the future, is of the greatest importance, for with its help we can see the significance of the epoch-making events of the past and the present, trace their connection, find a guiding-hand in their occurrence, and realize that all events in all epochs are intended to lead humanity forward to a goal which is glorious and wonderful. A grasp

Theosophy Gives
Right Values
of the theosophical outlook heartens and inspires us, makes us optimistic, and helps us to give right values to everything happening in the world, and to realize that all is well with the world, and that it is not at the mercy of unknown forces but guided by the Great Masters of the Wisdom to a magnificent end and purpose.

We have seen above that the next step in evolution is the development of the subtler senses and the awakening of the intuitive faculty in man. There are signs that a new sub-race is appearing, that a "New Age in Consciousness" is commencing, that the faculty of clairvoyance is coming into use and that this new consciousness touches the intuitional world.¹ But this does not mean that we should give up the old well-tried inductive method for discovering truth ; this method will be used and with very good results strictly within the domain of science by those in whom the intuitive faculty is practically dormant. And there is no reason why those in whom the subtler senses are developing and the

¹ *Anthropology* and several other monographs (see Scheme). See also *Thirty years of Psychical Research*, by Richet.

intuitive faculty is awakening, should not depart from the strict scientific method of induction *in their researches into the borderland of science.*

Borderland
Phenomena

For the investigation of subtler forces and subtler worlds, the employment of subtler senses is required. The use of physical power and physical apparatus may be of help up to a certain point, but beyond that point it fails.¹

If the scientist has not developed these subtler senses in himself, then the alternative would be that he might utilize these powers in other persons and collaborate with them in order to carry on his investigations further.² Then an immense sub-atomic world would open out to him, and what is obscure and hidden to him now as regards the "detailed structure and stability of different forms of atomic nuclei and the origin of elements" in the physical sciences, or the nature of disease in the science of medicine, or the nature of consciousness in the science of psychology, would be better understood.

Collaboration³

The immediate next phase in scientific research seems to be the phase in which scientists will collaborate, in their researches into *borderland phenomena*, with persons who have within themselves these subtler faculties developed, of penetrating the larger or the smaller worlds which are beyond the reach of the physical instruments.

It is gratifying to note that modern science, too, now recognizes "the limitations of science as a method of acquiring knowledge about reality."³ . . . "Science deals with but a partial aspect of reality, and there is no faintest reason for supposing that everything science ignores is less real than what it accepts."⁴ The scientific method of inquiry has served the scientist remarkably well in his investigations in a man-sized world but is found to be insufficient for the astronomical world and to fail completely in the world of atoms and sub-atoms.¹

Limitations of
Science

The scientific method of investigation has its limitations: "Science cannot, owing to the very nature of things, unveil the mystery of the Universe around us. Science can, it is true, collect, classify and generalize upon phenomena; but . . . the daring explorer, who would probe the inmost secrets of

¹ Review of *Physics and Philosophy*, by Sir James Jeans, in *Science and Culture*, January 1944, p. 259.

² *Some Experiments in Four-Dimensional Vision*, by Geoffrey Hodson and Alexander Horne. This book is an example of such collaboration—Ed.

³ J. W. N. Sullivan, *Limitations of Science*, p. 194, and p. 192.

Nature, must transcend the narrow limitations of science, and transfer his consciousness into the region of Noumena and the sphere of Primal Causes. To effect this he must develop faculties which are . . . dormant."¹

In this connection a glance at the diagrams given in the monographs "Matter and the Atom" and "Chemistry" is requested. This will help to make many things clear.

These diagrams show that the denser physical world and the other subtler worlds which are mentioned in theosophical literature exist side by side, here and now,² the subtler penetrating the denser.³ They also show that *the planes of consciousness and of matter are always linked together*, and that the constitution of man is analogous to that of the solar system.

We say that these latent faculties which are dormant in the majority of people could be "developed by suitable training and discipline; these are just as necessary for occult research as is the hard training which a scientist has to undergo for scientific research."⁴ What these training and discipline are is shown in theosophical literature.⁵

Now the most characteristic feature of the occult method, and because of which it is superior to the scientific method, is that the training which it gives and the discipline which it involves bring about *a change of heart, the inner change in man* which is so very necessary to solve the many complicated problems facing society at the present day.⁶ The scientific method of training has so far *failed*⁷ to bring about this change, and whether it will bring about that change in the future is doubtful; whilst in the occult method, where no external apparatus is used for research but where the man transforms *himself* into an instrument of research, the change of heart and purification of mind are certain, for it

¹ S. D., I, 518. (See Abbreviations.)

² *Relativity*, Part II.

³ *Chemistry*, diagram 4, Part II.

⁴ *Evolution and Occultism*, by Annie Besant, pp. 149-150.

⁵ The monographs on *Yoga, Philosophy and Psychology* in Part III of this series deal with this subject; also *The Joy of Self-Unfoldment*, in Part IV.

⁶ Vide *infra*.

⁷ (a) *The Thrill of Self-Exploration*, Part III.

(b) "Even if we restrict our view to the facts of recorded history, what evidence do we find of uniform advance in human morals? Does it not look

is only when he is *thoroughly purified* in his emotions, self-controlled in thought, with a pure, open and straight mind, and when his thoughts, emotions and actions are harmonized and all working under the direction of the *will* for a definite glorious object benefiting humanity, that he develops himself slowly into an occult researcher.

But there are stages in occult research. Long before the investigator becomes proficient in occult research and makes use of his clairvoyant faculties *objectively* there comes a stage where a person receives flashes of intuition, very rarely in the beginning, and they come only *when the mind is in a state of rest*.¹ As we see a clear-cut image of a mountain in a lake only when its waters are pure and still, so is the sun of truth reflected in oneself when one is pure, calm, balanced and harmonized. The brilliant thoughts which come to scientists and which culminate in epoch-making researches come from *the intuitional level* of consciousness,² and this intuitional level is *beyond the mental*. The immediate next step for the scientist of the present day is the development of this intuitive faculty. For the field of future scientific research, see diagram 5 in "Matter and the Atom," diagram 10 in "Chemistry," and all monographs in Part II.

In the domain of science also, intuition plays perhaps a far more important part than we realize. *The illumination may come as the outcome of months or years of mental search but the moment when it comes the intellect is passive*. Take, for example, the flash of intuition which came to Kekulé when he was day-dreaming; he saw a serpent devouring its tail and hit upon the theory of a closed chain or ring-structure to explain benzene and its derivatives. This had a far-reaching effect in the development of one of the most important sections of organic chemistry. Similarly a flash of

today as if the human race were moving rapidly and of deliberate purpose down the slope that leads to self-destruction?" ("Science as a Humanity," by Prof. W. G. de Burgh, *Nature*, No. 3839, 29-5-1943.)

(c) "But sometimes, alas, as we see today, Greed comes to conflict with Truth, and lust for dominion harnesses Science to ignoble ends. For all that science may have done to civilize him, man, it seems, can still be no less of a brute than he was. In the lurid light of happenings we see that civilization is not the same thing as culture." (Inaugural Address, Prof. B. Sahni, F.R.S., p. 4, Part II, Proceedings of the 27th Indian Science Congress, Madras, 1940.)

¹ *The Future of Science*, by Lester Smith, T, June 1938, p. 248.

² *Chemistry*, Part II, diagrams 1, 2, 3, 10 and 11.

intuition came to Newton when he watched the fall of an apple; *his mind was then quiet and at rest*, and in that condition the intuition found what he had been searching for. Jagadish Chunder Bose, in dedicating the Bose Institute on 30th November 1917 as a Temple of Learning, brought out this point very clearly when he said: "This I know, that no vision of truth can come except in the absence of all sources of distraction, and *when the mind has reached the point of rest.*"

And A. R. Wallace, co-discoverer with Darwin of the Laws of Evolution, had also a similar experience. "For three years", so he tells us, "the question of *how* changes of species could have been brought about was rarely out of my mind." Finally, in February 1858, during a severe attack of intermittent fever at Ternate in Moluccas, he began to think of Malthus's Essay on Population,¹ and, to use his own words, "there suddenly flashed upon me the *idea* of the survival of the fittest." The theory was thought out during the rest of the ague fit, drafted the same evening, written out in full in the two succeeding evenings, and sent to Darwin by the next post. Darwin in England at once recognized his own theory in the MS. essay sent by the young and almost unknown naturalist in the tropics, then a stranger to him.² (*Encyclopaedia Britannica*)

It may be pointed out at this stage that what was stated above about the occult method and occult training and discipline with reference to man as scientist applies as well in the case of man as man, for every man is a potential occultist and *it is impossible to separate the scientist from man.*

As the occult discipline has the power of changing the man from within, the question of abuse of power and the consequent threat to civilization does not arise.³ The problem of relationship between science and society and between research and social order will now be seen in its right perspective. That a scientist is also a member of society and a citizen of the state, and as such has his duties and responsibilities to them both, will now be recognized.⁴ The un wisdom of divorcing the science of man (spirit, consciousness, life) from the sciences of matter (form) will now be seen

¹ Malthus's Essay on Population: "Less food and more mouths to feed; food is produced in arithmetical progression while population increases in geometrical progression."

² See the monograph on *Methods of Research*, Part II, for other examples.—Ed.

³ Vide article on *The Atomic Bomb—A Challenge to Man*, in Part II of this Series.—Ed.

⁴ *The Social Function of Science*, by J. D. Bernal, F.R.S., 1939.

in its true condition.¹ It is this divorce which has led to the lop-sided development of human nature, resulting in the present chaos by the disturbance of social balance. Constituted as man really is, these two sciences cannot be separated. Theosophy recognizes the use and value of *both* these sciences.

INTERNATIONAL ORGANIZATIONS

The proposals to form
 a "Chamber of Science" by Sir Gowland Hopkins,
 a "Scientific League of Nations" by Ritchie Calder,
 the passing of the following resolution, which recognizes the principle of Universal Brotherhood, by the American Association for the Advancement of Science at the Indianapolis meeting on December 30, 1937, that—

"Science is wholly independent of national boundaries and races and creeds and can flourish permanently only where there is peace and intellectual freedom",

the formation of Committees on "Science and Social Relations" in some countries of the world,

the establishment of

the United Nations Organization (U. N. O.) in 1945 after World War II, now called simply, the United Nations (U. N.),

the United Nations Educational, Scientific and Cultural Organization (U.N.E.S.C.O.),

the United Nations Economic and Social Organization (U.N.E.S.O.),

the International Labour Organization (I.L.O.),

the World Federation of Scientific Workers,²

the World Power Conference on Fuel Economy at the Hague (1947),³

the Food and Agricultural Organization (F.A.O.),²

the World Health Organization (W.H.O.),

the United Nations Relief and Rehabilitation Administration (U.N.R.R.A.),

the International Refugee Organization (I.R.O.),

the International Bank for Reconstruction and Development (I.B.R.D.),

¹ Vide *Economics—a New outlook*, Part IV, of this series.—Ed.

² *Nature*, 12-4-1947, pp. 512 and 498.

³ A meeting of the F.A.O. Conference was held in Copenhagen in September 1946 under the direction of Sir John Boyd Orr, to consider the possibility of getting the whole world to take a big bold step to co-operate on a World Food Policy.

the International Trade Organization (I.T.O.),
 the International Children's Fund (I.C.F.),
 the Provisional International Civil Aviation Organization
 (P.I.C.A.O.),¹

—all these will now be seen as moves in the right direction, inasmuch as they all help to give a universal outlook, to experience a sense of wholeness, to grasp clearly "the integrated pattern of the United Nations' Activities", and to have a glimpse of what the new world re-organization is going to be like. They are all pointers to the beginning of the growth of an international spirit and outlook and a new spirit of unity which will take hold of the human race in future.

To a student of Theosophy, all these movements are only steps in the "formation of a nucleus of the Universal Brotherhood of Humanity, without distinction of race, creed, sex, caste or colour" which is the First Object of The Theosophical Society, founded in New York, November 17, 1875,—verily a precursor of the New World Order about which we have been hearing so much ever since the end of World War I. And does not the United Nations Charter of 1945 proclaimed to the world

"Blazing the
 Trail"

in the following words—"Universal respect for and observance of human rights and fundamental freedoms for all without distinction as to race, language or religion"—seem to come close to the *precisely formulated thought* expressed in the First Object of the Society as stated above? It may well be said that "the Society 'blazed the trail' which the U. N. has followed."²

Age of
 Specialization

This, again, is an age of specialization. Such an age has its place in the intellectual evolution of man and should by no means be under-rated, but it has a tendency to narrow and cramp the mind. This tendency requires to be corrected and counterbalanced by the *synthetic* faculty of the mind, a mind illuminated with the Divine Wisdom of which Theosophy is the embodiment. The aim of this Series is to act as a bridge between the past, the present and the future, between the known and the unknown, between religion, philosophy, science and art, and between Theosophy and Science,

¹ "Report of Conference of International Organizations", by James S. Perkins, General Secretary, Theosophical Society in America, pp. 9-16, *The Theosophist*, Vol. 68, No. 7, April 1947.

² *T*, pp. 6-7, April 1946.

so that we may catch a glimpse of the Divine Plan and recognize the value of any special researches in the general scheme of **Integration** things. **It is the integration of all methods and activities which we are advocating.** This will lead to far-reaching results and help us in the laying of the foundation of a new civilization.

In the light of the knowledge of the Plan and of what has been stated above, the crisis through which we have passed and are still passing at present and which threatens the disruption of our mighty civilization is a transitional and necessary ¹ phase in which mind has become dominant. We see before our very eyes fundamental changes and upheavals in every department of life. The old forms are breaking up as they should, in view of the fact that the world is entering upon a new age of consciousness in which the concrete, logical, analytical mind will occupy a subordinate position. **What is needed is to give a spiritual bias to the thought of the world** **spiritual bias to the thought of the world.** We must be careful *to see that the new forms we build are of the right type*, so that through them the new life may express itself fully. In this revaluation of all departments of life and in the building up of new institutions in place of the old, a study of the different monographs given in all the four parts of the book will be found to be of the greatest help.

A very important thing about Theosophy is that it gives a rational exposition of the Eternal Truths ² which are fundamental to all the religions; it gives the *modus operandi* of the noumena and phenomena of nature. **Theosophy and Rationalism** Theosophy gives the step-by-step process and the why and wherefore of religious doctrines, and therefore its interpretations appeal to us more than the simple and dogmatic assertions of the theologian. The line dividing the Free Thought and Rationalistic Movements on the one hand and the Theosophical Movement on the other is very thin. Both are opposed to blind belief, superstition, and irrational, orthodox religiosity. Both aim at giving a rational exposition of truths in nature. Both are highly rational and scientific. But the Theosophical teachings have an advantage over those of the Rationalistic school inasmuch as they fill up the gaps and supply the *motive power* and give a rationale for the *inner and upward urge* in

¹ To understand this point, see Prof. Marcault's *Sequence of Phases of Consciousness in The Old Order Changeth, Yielding Place to New* in Part IV of this Series—Ed.

² See last page, *The Thrill of Self-Exploration*, Part III of this Series.

life by showing the origin of man, his purpose in life, his relation to the universe, and his continuous evolution and glorious destiny.

Theosophy is science shorn of its materialism. Theosophy is philosophy shorn of its classicism. Theosophy is religion shorn of its worn-out dogmas and soulless traditions.¹ Theosophy is a synthesis of dematerialized science and philosophy and liberalized religion.

The beauty of Theosophy is that it not only gives the knowledge of the Plan and the goal, but that it is also pre-eminently practical, inasmuch as it shows the *discipline* as to how to attain the goal. Many have tried the discipline and realized the goal for themselves. (Vide infra)

The Beauty of the Discipline² harmonization, and detachment from the mind and body brings about an alchemical transmutation of the lower nature of man into the higher, makes man master of his vehicles, with the result that he becomes a man of noble character, selfless, loving, compassionate, incapable of misusing his powers, with his whole life consecrated and dedicated to service. At the same time it gives him a deeper understanding of the laws of life, helps to develop his innate faculties which will, if he perseveres, become capable of responding to the subtler vibrations coming from the astronomical and sub-atomic worlds. Thus this technique serves a twofold purpose of developing man into an occult researcher in the super-physical worlds and also making him cultured, refined and noble. This will help him to solve the multifarious *problems* facing the world at the present day which *he is not able to solve in spite of all the knowledge and power that science has given him for the simple reason that his character is not fully developed.*

What more glorious work could the Universities do for their alumni than the building of their character! The principal drawback in our present system of education is the lop-sided development of the individual. What is wanted is a harmonious development of head *and* heart *and* hand, of intelligence *and* goodness, of sciences *and* humanities—an all-round development. In view of the fact that all our present systems of training and discipline

¹ See "Science, a Basis for Philosophy", a lecture by Lord Samuel, President of the British Institute of Philosophy, on the occasion of the Silver Jubilee of the Indian Science Congress, Calcutta, *Current Science*, January 1938, p. 321.

² See General Introduction to the Second Edition, Vol. I.—Ed.

³ See *J. U. B.*, p. 31, Vol. XIII, Part V, March 1945.

have, more or less, failed to develop character in man, in view of the fact that the many deadlocks and complicated problems facing us defy solution in spite of all the knowledge the intellectual giants of the world have brought and are bringing to bear on them, we are driven to the necessity of advocating **a new technique**—which is nothing else but the old and well-tried occult or Raja Yoga discipline,¹ *to be adapted to our present conditions*, used by the wise men of the East for thousands of years with such splendid results—the establishment of a Chair in Occultism,² or, in other words, Spiritual Psychology, in the principal universities of the world. (Yoga means balance, equilibrium.)

The establishment of a Chair in Occultism² will, again, greatly help in checking pseudo-occultism which is unfortunately spreading in the world and was so much taken advantage of during the last war by a perverted use of the radio. Books on pseudo-occultism teaching “how to get rich quick”, “how to wield influence over one’s boss or people in groups and masses”, “how to get on in the world by pushing away all and sundry who come in one’s way”, etc. are sold by thousands and read by our young people with great avidity. It is the duty of the universities to warn the youths of the great danger which awaits them and society, by showing them what true³ occultism is. *The*

¹ See monographs on *Yoga*, Part III, and *The Joy of Self-Unfoldment*, Part IV of this Series.—Ed.

² “Occultism is the study of the hidden side of nature; or rather, it is the study of the WHOLE of nature, instead of only that small part of it which comes under the investigation of modern science.” (See diagram 10 in *Chemistry*, Part II.)

A Chair in Occultism—

The idea of having a Chair in Occultism in a modern university may appear to be strange. But it is not a new but an age-old idea.

There were forest universities in Ancient India (Vaidic Age) and garden universities and monasteries in the Middle or Buddhist Age. Nature was their keynote. They were built in scenes of natural beauty, surrounded by lovely gardens, fragrant with blossoms and shady with trees. “There, trees and plants, rivers and lakes had ample opportunity to live in close relationship with men.” Some of these universities lasted for thousands of years.

The famous institutions of learning were :

- (i) Takshashila, near Rawalpindi.
- (ii) Nadiya, near Calcutta.
- (iii) Nālandā, on the bank of Gangā to the south-east of Pataliputra (new Patna).
- (iv) Royal University of Vikramasila, on the bank of Gangā, (near Bhagalpur).

The chief characteristic of these universities was the stress laid on the awakening of the spirit in man, the development of his spiritual life and character.

This goal was achieved by giving first place to Discipline, which was Raja Yoga in the Ancient or Hindu (Vaidic) Age, and Monastical (Gnana Yoga—The Yoga of Wisdom) in the Middle or Buddhist Age.

All subjects taught had as the ultimate goal—the release of the Self.

The method followed was—Meditation, Study and Discussion.

³ See Preface, this Part.

talisman in true occult life is a clean, loving, unselfish life of service and sacrifice. The universities will, we trust, give this important question—the development of the character of their alumni—the mature consideration it undoubtedly deserves and will also see that the Faculty of Occultism shall not degenerate into a Chair of the occult arts, from white magic into black magic.

We may go a step further and say that the time has now arrived for the establishment of “Forest and Garden Universities”¹ in those countries in which the atmosphere for the establishment of such universities is suitable. By forest is not meant “forest as such but the being in close touch with Nature.” The essence of that Ideal is “to let her harmonies permeate the consciousness, and her calm soothe the restlessness of the mind.”¹

In these universities emphasis will be laid more on the awakening of the spirit and the development of spiritual faculties. The aim of the instruction will be deep and “profound thought rather than swift and alert thought,” it will be rather “drawing out the faculty which could discover a truth, hidden beneath a mass of irrelevancies”¹ than accumulation of facts and memorizing them. These universities will develop the *whole* man and so help to restore the balance of human nature which the present mind-dominated universities have *lost*, first, by their being deliberately located in the midst of industrial and commercial cities full of noise, hurry, stress and strain, and secondly, by great emphasis being laid there on the development of intellectual faculties alone to the detriment of the development of the heart and of the spirit. There is room for the *simultaneous* existence of both these types of universities in a country.

It should not be supposed that this Series, WHERE THEOSOPHY AND SCIENCE MEET, is intended *only* for students of Science and Theosophy. No greater mistake could be made. The book is meant for every man and woman who will take a little trouble to think, who wish to approach truth through a fresh, honest and unprejudiced mind, for it does not appeal to blind faith or authority. It is intended for those who are dissatisfied with the present state of affairs, and are anxious to do what they can for society. It is intended also for those who are intellectually discontented and therefore curious to know and find out the Truth for themselves. It is again meant for those who have in them a spirit of adventure, who are desirous of exploring

No Appeal to
Blind Faith or
Authority

¹ *Indian Ideals*, by Annie Besant, p. 28.

the latent faculties and hidden powers within their own selves, of discovering the Reality within.¹ And this discovery each man has to make for *himself*; no other person, however great he may be, can do that for him. The utmost another person can do is to show the way, but the way is to be trodden by each man by himself.

*"Loving action is Divine Wisdom at work, and whoso acts lovingly must inevitably come to the Wisdom."*² Action springs

A Stimulus to
Modern Thought

from conviction, conviction comes through right understanding, right understanding arises from right knowledge.

The aim of WHERE THEOSOPHY AND SCIENCE MEET is to give this right knowledge and understanding, also to inspire and stimulate right thinking and action. The Series does not claim consideration by any appeal to dogmatic authority, nor does it desire or claim to teach the doctrines, but with their help to interpret the world-drama, **to emphasize the spiritual nature of man, that he is more than his body and mind, to show his rightful place in the scheme of the universe, and to point out the Next Step in Evolution.**

To bring out the aims given above and to show the Plan of Evolution as given in Theosophy, a tentative scheme is given elsewhere. The scheme is merely suggestive, No one is more conscious than the editor himself of the many

The Scheme of
the Book

gaps in the scheme.

The interpretation of the world-drama as given in this Series,

A Theosophical
Background

WHERE THEOSOPHY AND SCIENCE MEET, in the light of Modern Science *and* the Ancient Wisdom will, it is hoped, give the reader a proper Theosophical background

for the conduct of life—a background which *amplifies* that given by Modern Science alone, and consequently, gives a proper perspective and a wider outlook on the nature of Man and the Universe and their bearing on his life and destiny.

D. D. KANGA

¹ See *The Thrill of Self-exploration*, Part III, and *The Joy of Self-unfoldment*, Part IV.

² F.P.T., p. 372.

AN EPITOME OF THEOSOPHY¹

By ANNIE BESANT

I. DEFINITION AND SCOPE

Typical Theosophists

EVERY great religion has two parts, an inner and an outer, a spirit and a body, "the knowledge of God", which "is Eternal Life", and its dogmas, rites, and ceremonies. The inner part, "the wisdom of God in a mystery", spoken of by St. Paul as known to "the perfect", is that which has, since the third century, been known in the West as "Theosophy"; in the East it has been known for ages under its Sanskrit equivalent *Brahma-Vidya*, "God-Wisdom", "God-Knowledge", or God-

Direct Knowledge
of God by Man

Science". Such Theosophy, or mysticism, the direct knowledge of God by man, belongs equally to all great religions, as their sustaining life, and may be possessed

by any individual, even outside any religious organization. The *Brahma-vadins*, "knowers of God", in Hinduism; the *Gnostics*, the "knowers", who, Origen declared, were necessary to the very existence of the Christian Church; the *Shaikh*, in Islamic Sufism—these are typical Theosophists from the standpoint of the modern Theosophical Society. No man is truly a Theosophist who has not direct knowledge of God, but he may win this through any religion or by his own unaided efforts.

Theosophy, in the modern as in the ancient world, proclaims the possibility of such knowledge, as the inevitable result of the immanence of God. Man is essentially a spiritual being, his self, or spirit, being an emanation from the Universal Self, or Universal Spirit, God, as a ray is an emanation from the sun. Hence, to know himself, his deepest self, is to know God; he can sink in consciousness into the depths of his own being,

The Immanence
and Transcendence
of God

¹ In all likelihood, no finer epitome of Theosophy (for which we are indebted to *The Encyclopaedia of Religion and Ethics*, Vol. XII, 1921) has been made, and we reproduce it here for the instruction of those who wish to know what Theosophy is.—Ed.

beyond the body, the passions, the emotions, the mind, the reason ; these are all his, but they are not he ; he can pass beyond them all, and realize himself as *séparate* from them, the pure " I ", pure being. This is the universal experience of those who, successfully, seek the Kingdom of Heaven within, and it is followed by the recognition that this Universal Being, into which the self opens, transcends all the beings in which it is manifested, and is alike in all.

Out of this experience, repeated for every one who becomes a knower of God, or Theosophist, are built the two fundamental truths of Theosophy : the immanence and transcendence of God, and the solidarity, or brotherhood, of all living beings. The realization of the first truth, man's identity of nature with God, as a fact in consciousness, and the subsequent realization of the second, his identity of nature with all around him, by a blending of his self with their self, a conscious dwelling in their forms as his own—these sum up Theosophy in its fullest and deepest sense. The man who has thus reached self-realization in God, and in all beings, is a Theosophist ; those who deliberately aim at such self-realization are also generally called Theosophists.

Theosophy as a Doctrine

The word " Theosophy " has further, historically, a second meaning : it denotes a body of truths, or facts, concerning God, man, and the universe ; and these may conveniently be classified under three heads : religion, philosophy, and science. On these truths is based its system of ethics, rational, inspiring, and compelling. In considering this body of truths we are not studying a system invented and published in modern days ; we have to do with what has aptly been termed the Wisdom-Tradition, handed down in all civilized countries, ancient and modern, by a long succession of prophets, teachers, and writers.

It may be traced in the *Upanishads*, *Purāṇas*, and epics of the Hindus, and in the six systems (*darshanas*) of Hindu philosophy ; it underlies many of the Chinese systems, especially Taoism, and is seen in such books as *The Classic of Purity* and in the writings of Lao-tze ; it is found in Egypt, as in *The Book of the Dead* and the papyri from which its religion has been reconstructed ; it appears in the fragmentary records of Assyria

and Chaldea; in the *Gāthās* and other Scriptures of the Parsis; in the Hebrew Scriptures as expounded by the Kabbālā and the Talmud; in the Christian, as treated by the early Fathers of the Church, and by such Gnostic writers as Valentinus, Basilides, and a host of others; in Pythagoras and Plato, with the Pythagorean, Platonic, and Neo-Platonic schools, with Plotinus, Iamblichus, and the theurgists; it is taken up from these by the doctors of Islām and the Sūfī mystics; appears in the Rosicrucian students of alchemy and astrology, in Rosenkreutz, Paracelsus, Bruno, Eckhartshausen, Boehme, Eckhart, Vaughan, Bacon, More, Fludd—all these and scores of others have assimilated and handed on the Wisdom-Tradition; it has lent its symbols to Masonry, and hidden some of its mysteries in Masonic ceremonies; it peeps out of Scandinavian and Celtic folk-lore, out of the Hawaiian legends and Maori traditions, the unburied temples of the Mayas and Quiches, the magic of the Zunis and other North American Indian tribes.

Its revival and its systematization into a coherent and interrelated body of doctrine, separated from non-essential and irrelevant teachings—this is modern, and is the work of The Theosophical Society, a modern association. But the doctrines themselves are scattered everywhere, through all times, in all places.

The test to be applied to a religious doctrine which claims to be theosophical is catholicity. *Semper, ubique, et ab omnibus*—such is the test. For all religions come from a single source, the Divine Wisdom, and have as founders divinely inspired men—men who have climbed up the ladder of evolution till they have reached perfection in humanity, and have entered on the superhuman evolution. Such men we call "Masters", and we regard them as the guides and directors of the evolution of humanity; the similarities in doctrines and ethics, pointed out by comparative mythology and comparative religion, we regard as due to the fact that all the founders of religions are members of the one Lodge of Masters, possess the same knowledge, and are guided by the same principles.

The universal—that is, the theosophical—doctrines of religion are: the unity of God; the manifestation of God as a Trinity for the building of a universe; the existence of graded orders of intelligences, a vast hierarchy of beings, forming

the inhabitants, visible and invisible, of a universe, or a solar system.¹ The doctrine of reincarnation, taught in every religion, though in some temporarily overlaid, belongs to the domain of philosophy rather than to that of religion; the immortality, or rather the eternity, of the spirit belongs also to philosophy more than to religion, when dealt with intellectually; the law of action and reaction—*karma*—falls under science, as do the constitution of a solar system and of man.

II. RELIGIOUS TEACHINGS

The Unity of God

The universal one Existence which is the source of all existences, actual and potential, the super-life and super-consciousness in which all lives and consciousnesses inhere, eternal beneath the transitory, changeless beneath the fleeting, unsupported but the support of all, all-embracing, all-containing, the One without a second—this is the central teaching of Theosophy as of all religions, the first universal truth of religion.

The Trinity of the Manifested God

This is the second great and universal truth of religion, and therefore of Theosophy. Theosophy speaks of the manifested God as the Logos, borrowing the term from Plato, Philo, and the Fourth Gospel.

“Coming forth from the depths of the One Existence, from the One beyond all thought and all speech, a Logos, by imposing on Himself a limit, circumscribing voluntarily the range of His own Being, becomes the Manifested God, and tracing the limiting sphere of His activity, thus outlines the area of His universe. Within that area the universe is born, is evolved, and dies; it lives, it moves, it has its being in Him; its matter is His breath; its forces and energies are currents of His life; He is immanent in every atom; all-pervading; all-sustaining; all-evolving; He is its source and its end, its cause and its object, its centre and circumference; it is built on Him as its sure foundation, it breathes in Him as its encircling space; He is in everything, and everything in Him. Thus have the Sages of the Ancient Wisdom taught us of the beginning of the manifested worlds.

¹ Vide diagram 6 in *Anthropology*, Part III of this Series.—Ed.

“From the same source we learn of the Self-unfolding of the Logos into a threefold form: the First Logos, the Root of all Being, the *Will* which outbreathes and inbreathes the worlds; from Him the Second Logos, manifesting the two aspects of life and form, the primal-duality, making the two poles of nature between which the web of the universe is to be woven—life-form, spirit-matter, positive-negative, active-receptive, Father-Mother of the Worlds—the *Wisdom*, or Pure Reason, ‘mightily and sweetly ordering all things’, sustaining the universe; the Third Logos, the Universal Active or Creative *Mind*, that in which all archetypically exists, the source of beings, the fount of fashioning energies, the treasure-house in which are stored up all the archetypal forms which are to be brought forth and elaborated in matter during the evolution of the universe, the fruits of past universes, brought over as seeds for the present.”¹

Unfolds into a
Threefold Form

The Hierarchy of Beings

This is the third truth universally accepted: the “seven spirits before the throne of God”; the primary emanations of the Supreme Trinity; the ranks of secondary Logoi, who rule congerieses of solar systems, down to the Logos of a single solar system. In such a system the vast hosts of spiritual intelligences (the *devas*, archangels, and angels of religions), the grades of spirits encased in human bodies, the sub-human intelligences and those not yet even awakened to intelligence—all these, with the Solar Logos

The Ladder of
Lives

at their head, form the ladder of lives, and evolve within the system. The sub-human intelligences include all nature-spirits, the gnomes, fairies, etc., who play so great a part in folk-lore, the living though limited intelligences who make all nature a living responsive organism instead of a soulless mechanism, whom little children sometimes see, and who are visible to the ordinary seer.

Universal Brotherhood

The fourth truth in Theosophy is that of Universal Brotherhood, the inevitable deduction from the preceding; since there is but one life in all forms, all forms must be interrelated, linked together, and,

¹ Annie Besant, *The Ancient Wisdom* (London 1897), pp. 41-42, with minor alterations, by the author herself, of course.

See also *Chemistry*, Part II, this Series.—Ed.

however unequal they may be in development, they none the less make one huge family, are "of one blood". The Universal Brotherhood of Theosophy differs from the political conception of "Equality", the foundation of modern democracy, in that it postulates identity of origin and of potentiality, but recognizes varying degrees of development, the latter yielding the hierarchy of beings, or ladder of lives. In this Freemasonry resembles it, with its broad division of mankind into the enlightened and the profane, and the subdivisions of the enlightened into degrees and graded officers, uniting the essential equality with the hierarchical order and due subordination. In this both Theosophy and Freemasonry are in harmony with nature, increasing power going hand-in-hand with increasing knowledge and increasing responsibility. Wisdom, supported by strength and made manifest in beauty, rules in a true brotherhood, as in nature.

It is interesting to note that these four primary religious truths of Theosophy, of universal religion, are but the intellectual formulation—for the instruction of the people—of the two primary spiritual truths directly contacted by the knower of God, the gnostic, the Theosophist. The first three are religious dogmas, expressing intellectually the first spiritual truth; the fourth is the expression in the outer life of the second spiritual truth. The spiritual truths can be *known* only by individual self-realization; they may be intellectually taught and believed as the fundamental dogmas of universal religion, Theosophy. A dogma is the intellectual presentment of a truth known by the spirit and believed on external authority.

III. PHILOSOPHICAL TEACHINGS

Consciousness

Philosophically, Theosophy is idealistic; consciousness is primary, the one indubitable fact, which can neither be strengthened nor weakened by argument. "*I am*" is the testimony of consciousness to itself, and nought can disprove its witness, since every disproof, every argument, must be addressed to that same consciousness, and imply its existence. To the All-Self, matter is but the limitations imposed by Himself on His thoughts; to us, evolving in a universe which is the manifestation of our Logos, matter is His thought,

limitations imposed on us by His thought and activity—limitations which we cannot transcend until we can realize ourselves in Him.

Human thought, though feeble and undeveloped, is of the same nature as divine thought, and increases its power over matter with its increasing growth; thought is the one creative and moulding power, and, as evolving man realizes this, and so clarifies his lower nature that this aspect of the self can work through it, he becomes the master of that lower nature and of his surroundings, the creator and controller of his destiny. By thought, mastering the science of physical nature, he bends it to his will and utilizes it; by thought, mastering the science of the emotions, he builds virtues and destroys vices; by thought, mastering the science of mind, he subdues his turbulent energies into orderly obedience; by thought, directing will and controlling activity, he brings all things, within and without, into subjection to the self "the inner ruler, immortal". Only by such fit rule and due subjection can man attain perfect health of body, emotions, and mind, and reach the highest good. Hence many of the practical theosophical teachings deal with this power and control of thought.

Power and Control
of Thought

Continuity

The eternity of spirit—more loosely spoken of as the immortality of the soul—is an integral part of theosophical philosophy. It is an inevitable deduction from the identity of nature of the human and the universal Self; "unborn, undying, perpetual", it is eternal as God Himself. The continuity of consciousness is equally inevitable, since the self is conscious and continuous, and in the self must consequently abide all its experiences, of which a successive survey is memory. The extent to which these memories are carried on by the material sheaths, or bodies, of the self—that is, the survival of the individual and the person—will be better considered under the constitution of man.

The Immortality
of the Soul

Reincarnation

The method of the unfolding of this continuous and conscious self in the human kingdom is by reincarnation. Reincarnation is, in fact, the only doctrine of immortality that philosophy can look at, as Hume said.¹ It means that the self, having

Reincarnation

¹ David Hume, "Of the Immortality of the Soul," *The Philosophical Works of David Hume*, edited by T. H. Green and T. H. Grose (London 1875-1876), IV, 404.

unfolded to the human stage, appropriates matter from the three worlds (see below) and builds it into bodies, suitable for life in those worlds, beginning in the stage of barbarism, as a savage of a low type. During earth-life he gathers experiences, pleasant and painful; after death he meets the results of these experiences—the lower in the intermediate world, where he suffers in the appropriate body of matter belonging to that world, and converts all these experiences into mental and moral capacities. When all are thus converted, he returns to earth-life, bringing with him these capacities wrought out of experiences, into new bodies built to express and utilize them. In these he goes through a similar cycle, gathering, suffering, transmuting, and so on and on; each birth brings the fruitage of the preceding lives to start the new pilgrimage, and this is the inborn character and temperament, mental, moral, physical. Step by step he climbs the ladder, working under inflexible and inviolable laws, until he reaches the stature of the perfect man; he passes through all the classes of the school of life until he has mastered all that this world has to teach, and is *asekha*—he who has no more to learn. He is then a man beyond birth and death, “fitted for immortality”, ready for work in the larger life.

IV. SCIENTIFIC TEACHINGS ¹

Occult Science

Theosophy differs from modern science in the fact that it includes under “science” investigations into superphysical worlds. Its methods are the same: investigation by observation of objective phenomena, reasoning on observation, framing of hypotheses, discovery of invariable sequences (*i.e.*, of natural laws), repeated experiments to verify deductions, and formulation of results. It uses the senses for observation, but the senses intensified—super-senses, in fact—responding to vibrations of matter finer than that which affects the physical senses.²

As with modern science, so with theosophical—“occult science”, it is usually called—there is a body of accepted facts, laid down by recognized experts and largely re-verified by later experiments, and a fringe of modern discoveries, constantly added

¹ Our Series WHERE THEOSOPHY AND SCIENCE MEET particularly deals with this aspect of theosophical teachings.—Ed.

² See p. 2, this Part.—Ed.

to, revised, and modified. The accepted facts have been established by generations of occult experts, and their existence is often referred to in the Scriptures of various religions; the more accessible of these are being constantly re-verified by occult students today, but the larger cosmological facts are beyond our reach. Any discoveries made by students are subject to revision and modification, as observations are repeated and the instruments of observation are improved.

The Constitution of the Universe

The broad outline of this comes from the seers of the past, and is largely confirmed in the Scriptures. It appears reasonable to us, and is congruous with the observations which we are able to make. The laws of analogy and recapitulation confirm it, for we see its outlines repeated in miniature within our own range of observation, and we see sequences rapidly repeated in miniature which the seers have described as occurring in a universe—as the aeonian evolution of the kingdoms of nature is mimicked in the growth of the embryo in the womb. A universe consists of seven kinds of matter, or planes, of which the densest is called physical or solid; the next finer, astral or watery; the next, mental or fiery; the next, spiritual or airy; the next, super-spiritual or ethereal; and the two finest, divine. What are called solar systems are all on the physical plane of the universe, and a solar system repeats within itself the seven kinds or states of matter, these subdivisions of the vast cosmic plane forming its planes, or worlds.

Seven Kinds of Matter

Within a solar system these subdivisions can be mostly studied by less developed seers, and we are in a field of research open to the occult student of our own day. We find in relation to our own earth: “physical matter”, all formed by aggregations of similar physical atoms, similar except that some are positive, some negative; these aggregations are grouped into solids, liquids, gases, and three kinds of ethers; “astral matter”, formed by aggregations of astral atoms, differing from physical atoms in shape, and grouped into states corresponding to the physical; “mental matter”, formed by aggregations of mental atoms, again distinguishable by their form, and again grouped as before; the “spiritual” and “super-spiritual worlds” are formed on

Physical

Astral

Mental

the same plan, each having its own type of atom and its own corresponding states of aggregation. Of the "divine worlds" we cannot directly speak.¹

The Constitution of Man

This is analogous to that of the solar system, and hence the possibility of knowledge concerning it. As said, he is a fragment of the Universal Self, and he is clothed in the matter of his system. In the divine world dwells his true self, the Monad, and his consciousness appropriates

matter from each of the five worlds below in order that
The Monad he may know and conquer them ; as the continuing "I",

he uses matter from the super-spiritual, spiritual, and the finer regions of the mental world ; this is the "spiritual body" of which St. Paul speaks ; it grows and evolves through the whole cycle of reincarnation, and beyond, but is not changed or lost in birth or death ; probably St. Paul refers to this when he speaks of our "house not made with hands, eternal in the heavens", which he says "we have". It is this spirit in the spiritual body which is the reincarnating Ego, or individual, though the term is often used to indicate only the consciousness working in the finer mental matter, in what is termed "the causal body", a subdivision of the spiritual taken separately. When the reincarnating Ego takes a new birth, he appropriates

some of the coarser matter of the mental world for his
The Reincarnating "mental body", some of the matter of the astral world
Ego for his "astral body", some of the matter of the physical

world for his "physical body" ; his consciousness, in thinking, uses mental matter, in desiring or sensating, uses astral matter, in acting in the physical world, uses physical matter ; these are "the three worlds" in which his evolution goes on, and in which he is affected by birth and death, and is a personality, or person, *i.e.*, the individual, as limited in expression by grosser matter ; the mental body is closely related to the brain, though not dependent on it, save for activity in the physical world ; the astral body is mainly correlated with the cerebro-spinal and sympathetic ganglia and nerves, and the glands ; the three bodies interpenetrate each other, mutually acting and reacting throughout waking life.

¹ See diagrams in "Matter and the Atom" and "Chemistry", Part II, in illustration of what is stated here.—Ed.

In sleep consciousness withdraws from the physical body, clothed still in its astral and mental garments, living then in the astral world, and sometimes, on its return, impressing on the physical brain some of its experiences in vivid and coherent "dreams"; it keeps in magnetic touch with its physical body. In death this magnetic touch is broken off, and the consciousness dwells for a while in the astral world, called often "the intermediate world", in relation to those who have passed away from earth. After a while the astral body dies, and the man passes in the mental body into the mental world, or heaven, where he abides for a period extending to many centuries, the length depending chiefly on the richness of his intellectual, emotional, and artistic past life on earth.

Coherent Dreams

When he has assimilated all the experiences of this nature accumulated on earth, the mental body disintegrates, the consciousness withdraws to the spiritual body with all it has gathered to enrich the Ego. Then the Ego builds a set of new bodies for a new pilgrimage in the three worlds, and returns to them by birth. Thus the evolution of man is carried on in three worlds, brooded over by the spirit—himself—the spirit garnering the results and unfolding thereby; he is an inhabitant of the three during waking life; of two during sleep and for a period after death; of one during his heavenly life.

How Evolution is Carried on ?

The lowest, the physical body, is at present the most perfectly organized, and therefore the most capable of receiving impressions from without and transmitting them to the consciousness. The astral body is rapidly becoming organized, and its proper senses are developing, so that it is receiving and transmitting many impressions from the astral world, though generally with a lack of sharpness and accuracy; these include the phenomena of second-sight, premonitions, warnings, visions, perception of phantasms of the living and the dead, etc.—the phenomena to which modern psychology is paying so much attention. An increasing number of people are "sensitive", or "psychic", and are using the super-senses, that is, the senses of the astral body, more or less consciously. The mental body is becoming well organized in educated people, but more in relation to its organ, the brain, than as an independent vehicle of consciousness, active in its own world. Consciousness, in the mental body, is in-turned rather than outward-turned.

Organization of the Three Bodies

The Practice of
Concentration,
Meditation

The occultist, having by the practice of special methods—meditation, concentration, etc.—artificially forced the evolution of the astral and mental bodies beyond the normal is, as regards these, many centuries ahead of his time; he uses the super-senses for life in the astral and mental worlds in his waking consciousness, and thus carries on his investigations in them as the physical scientist does in the physical world. The dying of the three bodies, and the building of new ones for each successive life-period, is the cause of the loss of memory of past lives; that memory is in the reincarnating Ego, and is shared by the consciousness when animating the lower bodies only if, in those bodies, the man has realized himself as one with the higher.

The Law of Action and Reaction

This is universal, and exists in the worlds of emotion, thought, and spirit as much as in the physical world. Hence a man

Karma

can build his character as scientifically as he can build up his body, and disregard of the mental and moral laws is as destructive of mental and moral health as disregard of physical laws is destructive of physical health. The study and utilizing of the laws, summed up as *karma*, forms an important part of theosophical work.

Evolution

The Monad gradually unfolds his powers by coming into touch with matter and appropriating portions of it; he thus passes through the mineral, vegetable, and animal kingdoms, until in a highly developed animal the intelligence reaches the human stage; thenceforward reincarnation under *karma* is his means of unfolding. Humanity, on our globe, takes on a fresh type—more delicately organized as to the nervous system—that of a Root-Race, when a considerable number of reincarnating Egos are ready to develop a higher quality of consciousness. The Third, or

The Ego taking
Birth in Races and
Sub-Races

Lemurian, Race was the first to assume the really human type in the middle period of its evolution—the previous types being embryonic; the surviving remnants of the Lemurian are the negroes and the many negroid peoples scattered over the world. The Fourth, or Atlantean, Race with

its seven sub-races—of which the Toltec, Akkadian, Turanian, and Mongolian peoples are typical—is still the most numerous. The Fifth, or Aryan, Race has already five sub-races—the Aryans of India, the Mediterranean Aryans (Arabs, the later higher class Egyptians, etc.), the Iranians, Celts, and Teutons—and has yet to develop two more.¹ These varying types afford to the reincarnating Egos the necessary varieties for their evolution, each Ego taking birth in the races and sub-races as often as is necessary for the unfolding of the qualities characteristic of each.

Human Perfection

By repeated reincarnations under inviolable law, each man reaping exactly as he has sown, man reaches his temporary goal —human perfection. At the present stage of evolution it is possible for him to reach this goal in advance of the evolutionary term, which will last yet for many millions of years. By strenuous exertions and noble and unselfish living, he may attract the attention of the spiritual Guardians of mankind, who will teach him how to quicken his evolution, so that he may enter on “the Path of Holiness”, pass through its five initiations—or stages of widening consciousness —and become a “Master”, the last of the five initiations opening the gateway of superhuman evolution. He may then pass into other worlds, or enter the ranks of the Guardians of this world as he wills. From the hierarchy of these Guardians have come the Founders of world-religions, the lesser prophets and teachers being their disciples.

*The Path of
Holiness*

V. THE ETHICS OF THEOSOPHY

These are not definitely formulated into any code, but consist of the highest and purest teachings of the world's noblest saints, prophets, and founders of religions. All that is sweetest and most lofty in the world's Bibles, all that is most inspiring and ennobling in the writings of its philosophers and moralists, forms the ethics of Theosophy. As man lives by the highest ethic he can grasp, he becomes capable of appreciating ethic yet sublimer; the Theosophist strives to live by the spirit of Christ

¹ Vide diagrams 3, 4, 5, 7, 8 and 9 in *Anthropology*, Part III, this Series—Ed.

rather than by any legal code, and, cultivating love, he hopes to be enlightened by the Lords of Love. Broadly speaking, that which works with the Divine Will in evolution is right; that which works against it is wrong; and the best examples of that will are found in such divine men as the Buddha and the Christ. These the Theosophist looks up to as examples, and strives to reproduce their likeness in himself.

WHY THEOSOPHY ?

By ANNIE BESANT

[THE following account appears on pp. 89-91 of W. T. Stead's book *Annie Besant, A Character Sketch*, 1891. It may be read along with another article of Annie Besant on *Modern Science and the Higher Self*, given in Part III of this Series.—Ed.]

Madame Blavatsky's *Secret Doctrine* had just appeared, and it was given to Mrs. Besant to review. The reading of that book was the turning point. When Mr. Stead was preparing this character sketch he asked Mrs. Besant to give him briefly the genesis of her theosophical development. Here is her answer exactly as he received it :

Why Theosophy ?

Could find no answer to problems of life and mind in Materialism, especially as touching—

1. Hypnotic and mesmeric experiments, clairvoyance, etc.
2. Double consciousness, dreams.
3. Effect on the body of mental conceptions.
4. Line between object and subject worlds.
5. Memory, especially as studied in disease.
6. Diseased keenness of sense-perception.
7. Thought transference.
8. Genius, different types of character in family, etc.

These were some of the puzzles. Then Sinnett's books gave me the idea that there may be a different line of investigation possible. I had gone into spiritualism, I went into it again, and got some queer results. But I got no real satisfaction until I got *The Secret Doctrine* from you [W. T. Stead] to review, and then I was all right.

I ought to add that I had long been deeply troubled as to the "beyond" of all my efforts at social and political reform. My own Socialism was that of love, and of levelling up; there was much Socialism that was of hatred; and I often wondered if out of hatred any true improvement could spring. I saw that many of the poor were as selfish and as greedy of enjoyment as many of the rich, and sometimes a cold wind of despair swept over me lest the "brute in man" should destroy the realization of the noblest theories. Here Theosophy, with its proof of the higher nature in man, came as a ray of light, and its teaching of the training of that nature gave solid ground for hope. May I add that its call to limitless self-sacrifice for human good—a call addressed to all who can answer it—came to me as offering satisfaction to what has always been the deepest craving of my nature—the longing to serve as ransom for the race. At once I recognized that here was the path to that which I had been seeking all my life.

THEOSOPHY AND MODERN SCIENCE

SOME FUNDAMENTAL CONSIDERATIONS

By PIETER K. ROEST

THE rigid mechanistic materialism of nineteenth century Science has broken down and a new scientific philosophy is re-establishing idealism—or rather mentalism—to a place of honour, if not of supreme authority. We need not review here the fascinating history of this revolution in modern thought. But among its many consequences are the rather premature shouts of victory from many believers of various idealistic creeds who have not even been witnesses of the battle, let alone fighters in it. Since Theosophy is often erroneously presented as an idealistic creed, one frequently finds members of theosophical groups maintaining that Science is at last beginning to see *their* light and will soon confirm *their* particular beliefs. Let us examine how valid this assumption is likely to be.

It proceeds from two notions. First: that reality can be represented by ideas, and that the particular ideas put forth in elementary theosophical literature are, if not the *complete* truth, at least completely "true". Second: that inasmuch as modern scientists seek truth, they will therefore eventually embrace these same ideas. The first of these notions was repeatedly exposed as fallacious by the greatest of recent theosophical authors, H. P. Blavatsky. Her point of view was that truth lies beyond any ideas we can formulate or express, and she frankly said of her *magnum opus*, *The Secret Doctrine*, that its study was but "a means of exercising and developing the mind never touched by other studies". "Come to *The Secret Doctrine*", she said, "without any hope of getting the final truth of existence from it, or with any idea other than seeing how far it may lead towards the truth".¹

One may ask: "Why then present ideas at all? Theosophy is a system of ideas, or it is nothing but a name for something non-existent or

¹ *The American Theosophist*, October 1936, p. 229.

for something no one knows anything about—which is *practically* the same". The answer to this is that Theosophy is the vision of reality common to members of the oldest occult fraternity in the world, and what has been publicly put forth as "Theosophy" since 1875 is either an effort by members of this fraternity to present a *fragment* of the *intellectual* aspects of this vision, or merely the personal interpretation of such fragments by others. Hence real Theosophy is by no means identical with "ideas presented in 'theosophical' literature"; although many of these ideas are indeed bridges by which the mind may reach—but only through its own vigorous efforts—that vision of reality to which the name of Theosophy really applies. As soon as this is realized, the fallacy of the second notion—that scientists and all other truth-seekers must eventually arrive at the ideas now held by a majority of the members of the Theosophical Society—stands also exposed. For obviously these ideas are a mixture of views and interpretations for which their originators claim nothing but a certain helpfulness in reaching the larger vision. No real *student* of theosophical ideas will claim finality for them; that is done only by thoughtless believers.

It is therefore only as *mental concepts approaching truth* that we can discuss "theosophical" ideas. While in the minds of teachers and students of these ideas they are woven together to form "the theosophical view of life", we must remember that such a scheme of thought is by no means identical with the "Theosophia" of the occult brotherhood already mentioned, but at best a more or less distorted fragment of it. Consequently no two "theosophists" do—or should—agree on any set of ideas as the real, the only Theosophy. In a really *Theosophical* Society there can be no orthodoxy!

We can therefore readily see that a comparison between "Theosophy" and "Science" is at best a labour of temporary compromise on what we shall consider as Theosophy and what as Science. And, incidentally, there is a good deal more agreement on the latter than on the former. This is largely due to better intellectual organization among scientists and to the voluntary but enforced restriction of their field of investigation; but also to the profoundly different methods of teaching used. Popular scientific literature seeks to present its subjects in the clearest possible manner and in language which appeals to the simplest minds. High-school textbooks leave no room for doubt; all the mind has to

Theosophy is the
Vision of Reality

Different Methods
of Teaching

do is to assimilate the images and ideas presented. Popular theosophical literature, while also striving for clarity and precision of expression, must needs use unfamiliar language for unfamiliar ideas even where it does seek to make learning easy. But all deeper theosophical works—especially those of H. P. Blavatsky—are written in such a way that some passages are difficult to understand. And this is inevitable because

The Need for
Secrecy

of the necessity of veiling certain truths for fear of their being misused and the consequent danger to society.¹ The wisdom of this policy modern science is now beginning to realize.² Hence such works are full of magnificent and suggestive phrases hidden amongst innumerable symbols and often apparently contradictory commentaries which is enough to scare away the spoon-fed mind immediately, and to make the disciplined western thinker frantic with irritation. It is only the persistent seeker who will find the gold that is hidden in these mines; while most readers will reject the popularized presentations of theosophical thought as mediocre, and the deeper works as fit for lunatics only.

So if these ill-definable "universes of discourse", Science and Theosophy, show any points of contact, that is indeed most gratifying; but it should by no means be taken as proof of the "truth" of either. We shall realize this more fully if we briefly examine the methods used by these two different disciplines of thought to arrive at "true" concepts.

¹ After the invention of the atomic bomb, this has become an important topic of discussion among scientists and statesmen. Vide article on "The Atomic Bomb—A Challenge to Man" in Part II of this Series.—Ed.

² "This practice of withholding certain secret knowledge from the profane was followed by the ancient Indian sages for it was supposed that if it was given out to anybody and everybody without discrimination it may not only harm the young inexperienced candidate for higher spiritual knowledge but also society. We now see that there may be some wisdom in thus withholding certain knowledge. The candidate had to prove his worthiness to receive such knowledge. Only when the teacher was thoroughly satisfied that his pupil would not misuse his knowledge for any personal ends for selfish purposes, but use it for the good of humanity, then only would he part with his secret to him.

"The analogy is not perfect; the two cases are not exactly parallel. In the case we are considering, the idea of keeping secret certain knowledge—say, for example, regarding the making of the Atom Bomb, is that the nation which has got this secret has the intention of using it for destroying the enemy nation or nations and is therefore careful that the secret does not go in the hands of the enemy to be used against it. In the case of the Guru and his disciple, the Guru would never dream of using his secret knowledge

Science relies, for valid information about reality, entirely on "objective facts", *i.e.*, on events perceived by the mind via sensation through the ordinary five senses—
 The Scientific Method of Inquiry with or without the extensions of the latter which we call scientific instruments: the microscope, the spectroscope, the galvanometer, the camera, etc. To these it applies the most rigorous inductive reasoning; preferably devising experiments to force nature to indicate which of its hypotheses is nearer to the "truth", *i.e.*, covers most of the facts observed. It makes no claim to studying reality (not today at least—it did so surely a few decades ago!); but frankly admits that "its subject of study is primarily our observations of nature, and not nature itself".¹ It seeks to reduce these "observables" to the simplest order, or scheme of concepts, which it can conceive. It frankly recognizes that all its "established laws" are conjectural—hypotheses acceptable today but perhaps overthrown by new discoveries tomorrow. It surmises behind the "observables" a number of "unobservables" which it names protons, electrons, photons, etc., but acknowledges the hypothetical nature of the latter: "Our unobservables are at best mere guesses".² Science, in our days, is no longer "organized common sense"—an old and honoured definition—nor does it boast of its formulations as final "truths"; it is acknowledged by its greatest representatives as "an Art Form" in the construction of which a vast number of "artists" collaborate on the basis of well-defined principles accepted by all. Amongst these are an impersonal honesty; extreme accuracy of observation, recording and calculation; clarity and precision of thought and expression; the duty of doubt and of criticism; and the "parsimony of hypotheses". The latter is very dear to scientists, and is at once the strength and the weakness of the "Art Form" they create. Its strength, because the simpler and fewer the "unobservables" which are conceived to give rise to the "observables"—the phenomena perceived—the easier will be our control of the latter, *i.e.*, of the world we live in. Yet also its weakness, because in the anxiety

for any destructive purposes and his only aim in not revealing that knowledge to the unworthy is the good of the pupil and of society. The idea of withholding the secret from the unworthy is not with reference to ordinary knowledge which was of course the common property of all without any distinction." (*Notes and News*, Journal of the University of Bombay, Vol. XVI, Part 3, November 1947)—Ed.

¹ Eddington, *The New Background of Science*, p. 282.

² *Ibid.*, p. 283.

to explain a multitude of phenomena by very few hypotheses it is easy to mistake the latter for the truth, the reality behind phenomena, and to refuse to consider any other hypothesis which may in fact be nearer to reality. And in some cases it has led to the wilful exclusion of "recalcitrant" facts from the field of scientific observation; as has long been the case with "psychic" phenomena.

Now Theosophy, as we said, is a vision of reality of which in theosophical literature we can catch only glimpses. Fragments of this vision are presented, which later are "interpreted" and put into some sort of order by lesser minds. Such "theosophical" schemes may be known by the authors as merely suggestive reconstructions, but they are taken by thousands of readers as revelations of final authority—exactly as is the case with Science! Informed and intelligent students keep this in mind, hence are not disturbed by discrepancies between scientific and theosophical "truths", or between different schools of thought in either scientific or theosophical interpretations. Discrepancies must be expected. It is enough for those students to know that both Science and Theosophy seek to create "truthful" mental structures which bring our minds closer to reality; each doing it in its own specific way. What is the way Theosophy uses?

Eliminating purely interpretative "Theosophy" and taking only those teachings which are presented as statements of facts by the few classical theosophical authors, we learn of three distinct ways by which they arrived at these ideas: 1. by direct observation; 2. by intuitive realization; 3. by instruction from intelligent beings still further evolved than the authors themselves. The last again resolves itself into the former two (for those teaching, if not for those taught); so we have to deal only with observation and intuition.¹ Superficially, these are exactly the same as used by scientists. Actually there is a considerable difference. First, scientists *do* use intuition, but distrust it until justified by observation—preferably by experiments. The true theosophist, on the other hand, develops intuition into a real faculty of knowledge; this being one of the prerequisites for membership in the occult brotherhood where further progress in understanding is possible and more rapid than by any other means.

¹ Vide Introduction to Part I, p. 9 and the monographs on "Methods of Research", "Chemistry", and "Whither Science?" in Part II, and the monograph on "And What of Art?" in Part IV of this Series—Ed.

The whole system of occult training is designed to that end. Hence he has good reason to use intuition increasingly, developing it into that faculty of direct spiritual insight which is found in great mystics, and which to them is as convincing and natural as seeing is to the eyes of normal man. Obviously then many theosophical ideas must remain mere speculations to non-intuitive minds, or to minds which always place observation above intuition, and systematically distrust the latter.¹

The Use of
Intuition

But while training the intuition as an instrument of knowledge, the occult student is not encouraged to ignore observation, but to sharpen and to refine it, and to use it not only for checking up on his intuitions and on the teaching he has received from those beyond him, but also for individual contributions to human knowledge. This process of refining one's powers of observation is naturally a gradual one varying with one's experience and industry. But as it proceeds, definite latent senses are brought into activity; senses *which extend one's range of observation far beyond that of Science with its best instruments*. It is this extended power of observation² which the real occultist uses intelligently, critically, and which his fraternity has used for many thousands of years to verify the views of its members and to make *their* Theosophy a genuine science, the greatest and most inclusive of all, growing and evolving like all modern Science.

Trained
Clairvoyance

This critical, intelligent, trained "clairvoyance" of the true occultist must not be confused with the practically useless psychism of mediums and fortune telling "clairvoyants" of our intellectual underworld. On the contrary, it is in full harmony with the ideals and methods of modern Science, with two important exceptions. One is the just-discussed use of finer instruments of observation—developed *in the living organism itself*—and hence the command over a far larger mass of phenomena. The other is the strict secrecy on vast parts of this occult knowledge; while modern Science boasts of its completely public nature, and is only just beginning to see the danger and doubt the wisdom of this policy. All knowledge is

¹ *An Anatomy of Inspiration*, by Rosamond E. M. Harding (1942) (Heffer) is worth reading on this subject.—Ed.

² *Extra-Sensory Perception and New Frontiers of the Mind*, by J. B. Rhine and *The Ultra-Perceptive Faculty*, by J. Hettinger are present-day scientific corroborations.—Ed.

a two-edged sword, and we are beginning to see that only too well in our war-torn age.

In consequence, theosophical formulations are bound to be quite frequently different from those of Science on the same subjects. For the latter is very restricted in its range of "observables", and many of the "facts" of occult research cannot possibly be recognized as such by students of the ordinary phenomena of our "normal" sense-world. Here lies the great chasm—as well as the bridge across it—between Science and Theosophy. Both rely ultimately on *observation*, carefully checked by many impartial observers. H. P. Blavatsky speaks of "the facts which have actually occupied countless generations of initiated seers and prophets to marshal, set down and explain"; and of their "checking, testing, and verifying, in every department of Nature, the traditions of old, by the independent visions of great Adepts", affirming that "no vision of one Adept was accepted till it was checked and confirmed by the visions—so obtained as to stand as independent evidence—of other Adepts, and by centuries of experience".¹ But while Science is strictly limited to what can be observed with the ordinary five senses, aided or not by physical instruments, and to ordinary intellectual process, Theosophy extends the

Fields of
Observation of
Science and
Theosophy

field of observation ever further by the development of normally latent powers of perception, and supplements the functions of the intellect by a progressive development and use of the intuition. Hence, assuming that the universe is *one* realm of law and not many, Theosophy will harmonize with Science in many ways, but be ahead of it, and therefore often be in disagreement with current scientific theories in many others. Besides, the need for secrecy about a vast portion of theosophical knowledge makes it almost impossible to present theosophical ideas as coherently and convincingly as scientific ones for which we recognize no such reticence as yet.²

Finally, the method of teaching scientific ideas is radically different from that of teaching the more profound theosophical ones; the former seeks to convince the mind of the correctness of its statements, making it all very plain; the latter does not teach directly but helps indirectly to develop capacity by activating the mind and intuition by the exercise it gives them to dig out the precious gems and seeds of thought concealed in symbols

¹ S. D., I, 293-4.

² Some exceptions are: patented processes of manufacture, the secret of making atomic bombs, etc.—Ed.

for the sake of secrecy. "Since, however, as before confessed, this work [*The Secret Doctrine*] *withholds far more than it gives out*, the student is invited to use his own intuitions."¹

Thus we may never expect more than a partial and sporadic agreement between these two disciplines of thought ; and this is exactly what we find. While some may become enthusiastic at the discovery that there are many more agreements than they had ever heard of—enough to write books about them—the sober student will not allow this enthusiasm to blind him to the large areas of disagreement that remain. Neither will he be dismayed by the latter, since the considerations presented here show them to be inevitable.

It cannot be expected either that scientists in general will accept these considerations and acknowledge this interpretation. For the

existence of extra-normal powers of perception and of a

brotherhood of really intelligent occultists lies outside

the scientific "universe of discourse". It is customary even among the

greatest of western scientists to blandly ignore oriental knowledge, and to

start the history of critical thought with Greece. Yet it is exactly in

oriental civilizations that we find the most conclusive evidence of the

existence of occult powers of perception and of an occult fraternity which

none but the most determined and developed truth-seekers may enter. So

it remains with the actual correspondences between Science and what-

little-we-know-of-Theosophy to establish such a strong case for the

existence of a genuine *Guptavidyā* (Secret Science) that honest thinkers

will at last make efforts to extract the grains of gold

from the ore of theosophical literature. Then indeed

they will meet with many surprises, not the least of

which will be the discovery that no literature is richer in suggestive ideas

that will provide stimulating working hypotheses for almost every field of

Science, than is that bearing the noble name of Theosophy—the knowledge

of the Gods !

MICROCOSM AND MACROCOSM¹

By F. L. KUNZ

Preamble to the Constitution of the United Nations Educational, Scientific and Cultural Organization, which is to be located in Paris :

“ THE Governments of the States parties to this Constitution on behalf of their peoples declare that since wars begin in the minds of men it is in the minds of men that the defense of peace must be constructed ; that ignorance of each other's ways and lives has been a common cause throughout the history of mankind of that suspicion and mistrust between the peoples of the world through which their differences have all too often broken into war ; that the great and terrible war which has now ended was a war made possible by the denial of the democratic principles of the dignity, equality and mutual respect of men and by the propagation in their place through ignorance and prejudice of the doctrine of the inequality of men and races ; that the wide diffusion of culture and the education of humanity for justice and liberty and peace are indispensable to the dignity of man and constitute a sacred duty which all the nations must fulfil in a spirit of mutual assistance and concern ; that a peace based exclusively upon the political and economic arrangements of governments would not be a peace which could secure the unanimous, lasting and sincere support of the peoples of the world and that the peace must, therefore, be founded, if it is not to fail, upon the intellectual and moral solidarity of mankind.” (The purposes

¹ The author has re-written his monograph and in doing so has based it mainly on his editorial article in the April 1946 Number of *Main Currents in Modern Thought* published in N.Y., U.S.A. In the first edition the monograph appeared under the title “ From Macrocosm to Microcosm ” ; in the present edition the title of the monograph is “ Microcosm and Macrocosm.” The author attempts to show in this article how very essential it is to have knowledge about the true nature of man on which to base our education in the New Age. Integration of knowledge follows only when the concept about man is whole and not partial as it is now. See *Main Currents in Modern Thought*, October 1947, pp. 75-76 and 83-86 for “ The Foundation for Integrated Education, Incorporated ”.—Ed.

See also General Introduction to Vol. I, Part I, and *The Thrill of Self-exploration*, Part III, Vol. II, this Series.—Ed.

and functions declared in the next Article include the preservation of "the independence, integrity and fruitful diversity of the cultures and educational systems of the States members of this Organization", and other enlightened provisions.)

It is reported that Siddhārtha Gautama Buddha was asked whether he believed in wonders. By this was meant divining, necromancy, and the like. He is said to have affirmed a belief in one wonder: Education.

Today in many countries vast masses of populations receive schooling, and in some of them free and compulsory education for some years is the rule. But what goes on therein is not education in the essential meaning of that

Literacy used for
Exploitation

word. The product, concerning whatever most matters in human living, is a form of literate ignorance. Were it not for cultural traditions, this literacy could fairly be judged a curse. There are countries wherein the advantages of literacy are used to exploit readers of newspapers and magazines, converting people into consumers and workers. Thus what might be a great liberating event for the soul is degraded to mere brightening of the mind and quickening of emotional and physical appetites. The manipulators of printing press power, conjoined with capitalist enterprise,

Ungoverned
Increase of Wants

frankly speak of increasing people's wants, and state and society are helpless, as yet, in their efforts to defend the human soul—which needs strengthening in philosophy, aesthetics, and the will to the good—against this excitation of the psyche and ruin of the body which ungoverned increase of wants is today accelerating.

The problem runs even deeper. More profound than soul, the historian of culture sees the supreme demands of the human spirit, the place of creativity and freedom, the threshold upon which the individual may perceive his true source in the noumenon. These powers are essential to democracy, the political mood of the times. But the rear-guard actions fought by economic despotism, the machine-minding requirements of a mass-production society, are all calculated to block the aspirations of the literate population toward individual self-expression in a full life. Thus education creates a conflict. Somewhat well-read in the principles of liberty, and encouraged in the arts, millions are released into a society which contains elements which have no intention of confirming that fair hope. Thus we create the forces of revolution.

It is true that the increase of mass-productive techniques forces society to give leisure, and that the rights of people to security with that leisure have now been widely voiced. In the end, whether it be by relatively peaceful transition throughout the world, or whether it be after the most violent of wars yet to come and a restart of leadership from Asia, the circumstances proper for the use of leisure in freedom to ends of creative living by masses of population will come about.

That makes the educational problem acute. If we have not, before that leisure comes, developed a curriculum and teachers ensuring strength to the soul and spirit of man, then the long struggles for leisure and security will only have been endured to confirm physicalism and psychism, worldliness and selfishness, partial schemes of living false to the meaning of human life. The relation of higher self, spirit and soul, to lower self, psyche and body, has now become the greatest issue of the age.¹ It has emerged as practical politics, practical sociology, on a world-wide scale. And the happiest omen of our times is that large numbers of educators are coming to see the situation clearly, and curricular revision is going on in many places looking to a proper integration of knowledge to spiritually meaningful ends and to proper social uses.

Those colleges and great universities showing conscious concern conceive the problem at levels of highest worth and fullest responsibility, and in terms growing more nearly identical month by month. Among such educators the question is no longer: Shall we tinker together a survey course or two, and introduce as much fundamental discipline as we can, and let it go at that? The issue has been instead boldly defined as that of re-surveying all knowledge and experience, and of discovering valid co-ordinations which will draw the arts, philosophies, sciences and religions together *upon a basis of principles* honourable to every member of the family of subjects we call general and liberal education. This, in effect, is the new responsibility honestly confronted by conscientious educators, acting as citizens, as historians perforce, many of them as bereaved parents resolved to bring public profit out of their private sorrow.

We propose to discuss the subjective aspect of the impending objective discovery of many cross-connections. For it seems obvious

¹ See Diagram 2, General Introduction, Vol. I, this Series.—Ed.

that since cultural gains are the product of human life, they have their roots, and can be integrated by reference back to that well-organized going concern we call a human being. Hence the task of improving integration in the curriculum is the same as the problem of getting increased understanding of human nature which, unevenly stirred to expression, has given rise to the disorder and disproportion in cultural riches which smother the student with senseless opulence. Before the rise of science in the modern sense the other three cultural moods have had historically several periods of effective mutual equilibrium, resulting in high civilizations. It is commonplace to say that science is our great gift and our equally great peril not because it is evil, but because it is

Science Prized out
of all Proportion

prized out of all proportion. Its recent more and more violent uses in war, as an a-moral tendency in peace, have forced us to see four truisms: Science is governed by factual and not prompted by ethical standards. It has created machinery which is capable of destroying western society. It has enlarged knowledge until the jungle of data plunges the plodding mind into gloom so deep that law and order are seen as narrow and doubtful trails in the gathering darkness. Some of its advocates assert an almost arrogant claim for precedence over the other three older moods of man. In sum, science has overreached itself in such measure that if it were not for the

Science has over-
reached itself

hopes of freedom from want and slavery it has promised through its gift of technology and mass production, men of intelligence might well judge it to be too violent a force to be tolerated on terms equal to the peaceful and humane moods natural to culture in a true sense.

Before this came home starkly to the world on August 5, 1945, there had been many attempts to unify subjects through one great theme or department, such as history or sociology, and new attempts are current to group everything round some disciplinary subject. But to the institutions which have committed themselves to discover a world view for our times these are now not enough, for a reason which can be simply put: the essential challenge to our continued existence comes from the central-most requirement of science, which exaggerates one small part of the nature of man (concrete mind) to insufferable dimensions of self-importance. If this aspect of our nature were not so closely allied to the ego-complex it would be easier to deal with our problem. But under the circumstances of fact, there is no

The Concrete Mind

solution which does not proceed from, and work further to promote, a wise understanding of man's whole nature and his relations to the whole of Nature.

It may be laid down as axiomatic in the problem that the more we concentrate chiefly upon training the intellect (by whatever means selected), the more we worsen our position by giving the case away to science in its most aggravated assumptions. Have the labours of Freud, Jung, Adler, Brill, the insight of Chinese sages and of Goethe and Plato, the genius of Patañjali, Pāṇini and S'aṅkara, and the illumination of Jesus and Buddha passed by us without effect, that we can think in such naive terms to solve the problem? The whole psychosomatic structure is involved in the task of unifying experience by identifying the natural-moral principles common to all four cultural disciplines. Only upon this core of laws natural and spiritual can one central course of study be set up, in which full advantage can be taken of the most recent development in science itself in order to reunite the cultural family. When such a skeleton has been developed, there need be no further question except as to pedagogic procedure.

What attitude in philosophy needs to be brought forward if hope is to be justified that we can comprehend in principle the whole appearance of Nature? Is the constitution of man so contrived that he can organize all knowledge around himself and need not be driven like some rat down a maze of job-specialization to earn a bit of cheese but no freedom at the end? We pass by, but only for the present, the immensely urgent question: How do we set up production and distribution so that this narrow specialization shall no longer be the whole life for some, and machine-minding for most, of mankind. We address ourselves solely to the question: How is human nature to be viewed and trusted, that we may in confidence try to marshal the whole before the mind of the adolescent and the young adult?

In this century it has become possible to make a new start, drawing no longer exclusively upon comparative religion, perennial philosophy, psychological matter, and other materials close to man in essence. In fact, so long as those were the only supplies the results are open to skeptical disregard. Now we have unmeasured gains from the physical sciences contributing to our knowledge of the background common to man

and the rest of Nature. It is true that we have to do a very great deal, and much better, biological thinking in order to fill in the foreground

Unification of
Knowledge

to that background, that man may be placed intelligibly in the whole. Until this biological gap is filled in we shall continue to see the natural longing of man to

understand himself exploited by a variety of fantastic cults drawing funds from uncritical people. The responsibility rests upon philosophers to meet these proper needs of humanity with concepts. A little further along in this discussion I shall show what has to be done, in my opinion, to effect this unification of knowledge, using science's own gains to restore proportion among the four disciplines. We would first, however, point out that as there have been times in the past when such proportions did exist, we can make a start with the older doctrines in philosophy

The Whole Nature
of Man

which promote such integrative effects. Once we get the notions required, then the applications to contemporary experience, and the codification of science, can proceed.

The immediate question is: Where shall we turn for a useful outline of the whole nature of man, the best precipitate of learning up to this time?

The answer, as seen from here, is in the old doctrine of microcosm:

The Doctrine of
Microcosm

the view that man is, by right of highest evolution among living creatures, an epitome in very small of the principles in the universe. This doctrine, in noble

form in Plato and in the Sāṅkhya-Yoga, is quite different from anthropomorphism. The unity is to be sought in deeply buried principles common to man and to Nature, somewhere at the level of the properties of space-time-energy as a universal and harmonic whole.

This venerable "correspondence doctrine" is close to extinction in

The Correspond-
ence Doctrine

the West, as a philosophical principle capable of usefulness in the sense we contemplate. Those technically interested in its European status may consult George

Perrigo Conger's indispensable *Theories of Macrocosm and Microcosm in the History of Philosophy* (Columbia University Press, New York, 1922). Though in the West it is nearly lost to view, in India it is necessarily central and very alive. What we propose here is to state as briefly as possible some of the Indian assumptions regarding the doctrine, and the relations it has with generally conceded partials of its principles which are alive among us, though not yet formulated as part of a whole concept of man's place in the universe.

Supreme or Absolute Being bears in Sanskrit the name *Brahman*.

Brahman

This is the crude form of a neuter gender word which correctly in the nominative is *Brahma*. It is to be sharply distinguished from the masculine form which differs from it only by having a long sounded vowel at the end : *Brahmā*. *Brahman* is thus one of the greatest words in the Sanskrit language. The root is *Bṛh*, literally, " great ", or, actively, " to swell ", or " to make great ".

The Doctrine of
Macrocosm

Brahman, is not only the creator, but causeless cause, and it is inappropriate, according to one important school of Indian thought whose chief protagonist is S'aṅkara, (and St. Paul, as he said on Mars Hill), to worship this Ultimate with forms contrived by human ignorance or to predicate properties in the ordinary way. From that source alone arises all, both external worlds of sense-perception, and likewise inward experience of farthest reach and utmost depth. This is the " unknown " but by no means unknowable " God ", encompassing the whole by reason of being the whole. No exception can be made for the meanest part or episode in Nature or in human life. In this view deity does not only mark even a sparrow's fall but indeed is the sparrow and the fall.

Man is One with
Brahman

Man is one with this, the whole. As organism, whether bodily, or mentally, or spiritually, he is one with it inasmuch as organism and environments are two parts of one whole. As consciousness, which is the gate to Ātman or true Self, he is an immortal atom therein, and as such is capable of knowing through proper discipline what he may not know through physical organism alone, namely, the One as unmanifest in contrast with the same as manifest world. Putting the situation in modern language, Brahman is the universe as perceived in worlds and nebulae and island-universes, and no less the universes as dark nebulae and maximum entropy. It is with this absolute whole that man is one.

The Creation
Hymn

The *Ṛg Veda* (X. 129) addresses our attention to this causeless cause. The compactness and power of the so-called Creation Hymn touch even the least philosophical minds, if they respond to majestic poetry. The meanings buried within this one passage are profound in reach, and must engage us elsewhere if we hope to probe the meaning to the core. For the present it is enough to cite the mantra as an illustration of the conceptual scope of the sacred philosophy of the Veda.

The Creation Hymn

"Non-existence then was not, nor Existence; neither Firmament, nor Empyrean there beyond :

"What covered o'er all, and where, or what was any resting place ? What were the Waters ? Fathomless abyss. (1)

"Then was neither death nor life, nor any fetch of night or day ;

"That one breathed breathless by intrinsic-power, none other was, nor aught there-beyond. (2)

"In the beginning, Dark-Inert was hid by Dark-Inert. This all was fluid, indeterminate ;

"Void by void was overlaid ; That One was born by all-might of intension. (3)

"In the beginning, will arose therein, the primal seed of Intellect, that was the first :

"Searching the heart thoroughly by thought wise-singers found there the kin of Existence in the Non-Existent. (4)

"What trace was stretched across below, and what above ?

"Seed was, Allmight was ; Intrinsic-power below, Purpose above. (5)

"Who knows it aright ? Who can here set it forth ? Whence was it born, whence poured forth ?

"These angels are from its pouring-forth, whence then it came-to-be, who knows ? (6)

"Whence outpoured this came to be, or whether one appointed it or not,

"He who is Over-Eye thereof in uttermost Empyrean, he knows indeed, or knoweth not. (7)"¹

From the above described cause arise the universe and universes, from within. The later Sanskrit literature, with lessening grandeur but with something nearer akin to our limited minds, described in rich and varying imagery how the manifested worlds and creatures came to be. The whole of a universe is described as a "golden egg" (Hiraṇyagarbha), an image consonant with modern opinion that all the millions of island-universes are finite but boundless spherical systems ; and in this the One is imaged as himself, now as active creator. Here arises Brahmā, the

¹ From : *A New Approach to the Vedas*, A. K. Coomaraswamy, Luzac, London, 1933, pp. 54-56.

masculine gender form, by means natural enough. And so by a series of transformations consonant with the best theology of all high religion, the present complex universe is brought into being, in the Hindu view, not alone physically. This outward-going process has a name (as a mode of

The Involution-
Evolution Doctrine

conduct), *pravṛtti*, outward going or involution, the opposite of *nivṛtti*, return evolution—for evolution in broad outlines is familiar in Indian literature as the *Avatāra*

or divine incarnation doctrine. The sequence of forms is exactly as provided by modern western science, but only six great biological stages (phyla) are described.

Conjoined with the involution-evolution doctrine is another, also conformable in a certain degree to modern scientific notions. This is the concept of the *kṣudrabrahmāṇḍa*, meaning, freely, what we mean when we say microcosm and speak of man being made in the image of God.

Because Brahman is all, it follows that any evolving individual

Phylogeny
recapitulates
Ontogeny

creature can only approach that nature. There is no other goal since there is no other at all. Human beings are held to be high in the evolutionary rank in the physical world. Hence the Hindu view is that every

part of the body (and, of course, of the mind, soul, and spirit) have an exact correspondence with some significant principle in Nature. The idea is agreeable to the well-known modern belief that phylogeny recapitulates ontogeny.

It is further held that since mind and soul are likewise modelled upon appropriate ultraphysical principles of the One, therefore body and mind correspond part for part through this Unity in which both inhere. There is in physiological science today no doubt that psychic disorder leads to physical disturbance, as when worry leads to stomach acidity and then to stomach ulcers, or when psychic-based allergies appear. But here two elements are missing in modern thought, both present in the Hindu attitude. First, we moderns have not probed far into the wholesome and

Relation of Mind
to Body

normal relations of mind to body, having been over-concerned with unbalanced endocrine and other pathological states. The second hiatus makes our thinking

even more desperate with that of India. We do not in science conceive mind and soul to have existence independent of body, and as fitted parts of a whole environment natural to them, in the way we admit physical body life to be exquisitely adjusted to its own material environments.

Man, as a microcosm, however, is explicit in Indian thought and essential to it, and the following passage is one of hundreds which might be chosen to illustrate it from a vast literature, which depends for understanding upon that doctrine, in the sense just described.

The passage is a ritual instruction from the S'atapatha Brāhmaṇa (XI, ii, 6. 13). It distinguishes two states of mind as appropriate to the Brahmin priest while he is conducting certain rites. He may direct his thoughts to the gods (devas), in which case the result will be of a certain character; or he may direct his art scientifically and with precision to his relations as a microcosm to the macrocosm. The passage evaluates the latter as the higher worth :

"One should say, 'This is the deva-yājī', and 'This is the Ātma-yājī'. He is the Ātma-yājī (literally, self-sacrificer) who knows, 'By this rite this member of my body is rectified', 'By this rite this member of my body is restored'. . . . He is the deva-yājī (god-sacrificer) who thinks, 'I worship the gods with this, I offer it to the gods'. . . . (The latter) does not conquer so great a world as the other."

Plato, of course, most memorably in the Timaeus, pursued precisely the same theme, and to the end maintained that the soul of man is spherical, as the universe is spherical; that both are harmonic, and the body, in principle, harmonic with them. It is Aristotle who wrenched us from the older context of thought.

For the present, respect for experieness of mankind, broader than physical science alone provides, must wait upon a full restoration of European mentality to the world context, which is proceeding apace however much we resist the confluence of cultures from India, China and Asiatic Russia, from learned Jewry, from the Islamic heirs of Chaldea, Judea and Egypt, from the regions where animism still lingers, and from Europe and the New World.

The greater the rank of the scientific thinker, the likelier he is to see the need of unification. "I consider", says Joseph Needham in his appendix to Charles Earle Raven's *The Creator Spirit* (p. 288, Hopkinson, 1927) "that the scientific method, with its dependence on the logic of induction, its constant employment of the statistical process, its inevitable intellectual analysis of its subject, and its essentially metrical nature, cannot be considered the only way open to man in his longing to move forward

Microcosm and
Macrocosm

The Confluence
of Cultures

The Need of
Unification

toward the essence of the world. To regard it as the singular approach, or even the principal path to Truth would be to fall into the pit of scientific naturalism out of which we have been so diligently climbing since the Victorian period. It would be to succumb to what Whitehead calls the 'Fallacy of Misplaced Concreteness'. We must believe that other kinds of experience give valid accounts of Reality, and that forms of human activity, such as Philosophy, Religion, Aesthetic appreciation and Poetry, produce autonomous interpretations of the nature of the universe". This distinguished

The Scientific
Method

Other Kinds of
Experience

biologist goes on to define mechanism (already dead since Needham wrote) as a useful hypothesis, not as a theory or metaphysical system. Its value is due to its conformity to measurement systems. Needham reminds us that Lotze (*Microcosmos*, p. 399, Clark, Edinburgh, 1894) says that mechanism is a universal but a secondary in cosmos. If so, what is the ultimate? We cannot answer this question, but the universals of Logos or consciousness and of cosmos or life with which Plato and the Hindus were concerned may be taken as primary or tertiary (if energy or chaos is secondary), as the first triplicity of that ultimate. Such, at least, is the Indian view.

It will now be useful to point out why and how we may expect the data of recent and contemporary science to document such a point of view, without distortion of knowledge to fit pre-conceived notions, although challenging the poor positivism which is so prevalent in our times as an end-product of older crass materialism.

A new situation arose in the last decade of the Nineteenth Century. Then, in the prophetic words of H. P. Blavatsky, materialism received a death blow. Electronics dissolved the world away into a diaphanous

Death Blow to
Materialism

mist of insubstantiality, quite literally. When Einstein made his epochal advances he confirmed this gain, making light the basic constant in Nature, the great diaphany. Thus he confirmed the *māyā* doctrine, and abolished the notion of a luminiferous ether, substituting the properties of space-time for the older crude notions of an ether. Finally, in the last few years, an additional step has been taken, this time in chemistry. Linus Pauling and others are stating the fundamental laws of matter in terms of the resonance theory. The chemical bond is now believed to exist not only and crudely because of octet or like orbits and geometries of atoms, but because the velocities of electrons in outer binding orbits, their spins, and the like are

harmonic functions. Thus we come full round to the idea of an *ākāsha*,
 What is *Ākāsha*? a primordial ordered space, clearly stated in Indian
 thought and re-vitalized by Plato. We have our
 attention concentrated upon a sonorous ether, in place of a luminiferous
 ether. It is what Northrop calls so well, in his recent work, *The*
Meeting of East and West, the "aesthetic continuum".

The Meeting of
 East and West And what does this mean? It means that the fusion
 of art with science on Pythagorean, yet contemporary,
 terms is proceeding. And it means for man that he is to be regarded
 as a being existing in forms which are the supreme achievement of a
 basically harmonious universe, a creature who does violence to that
 harmony, and who pays in suffering and learns as a soul. Thus *karma*
 returns to the scene of thought, and *dharma* is not far off from realization.

There is an enormous amount of work to be done to get all this
 in order for college and school use. Many great
 Body, Psyche, Soul
 and Spirit obstacles have to be confronted, and surmounted.
 That there is more than one remove from the Absolute
 to physical man is a great truth that must come back, and I hope to
 see acute studies of body, psyche, soul and spirit restore this truth,
 as T. Subba Rao so clairvoyantly saw necessary. His well-known
 discourses on the *Gītā* and *daivī prakṛti* should get more serious attention,
 so that spirit as the subtlest form of energy can be understood. The
 functional reality of this inner complex of psyche, soul and spirit must be
 brought home to all educators.

We have to come to understand how the monad or *Atman* is
 surrounded by an organized system of the greatest complexity and wonder
 of all the physical organisms, but that this intricacy is ordered upon a
 divine pattern. Such study must bring sound physiology and anatomy
 A Divine Pattern into a new order, and make meaningful the occurrence
 in great numbers of the giant Betz cells in the human
 fore-brain, their less frequent occurrence in domestic and progressively
 diminished frequency in wild animals. We have to probe into the
 unique feature of man, self-consciousness, to find what is beyond it,
 experienced in illumination. We have to understand as educators what
 happens in man through the intervention of the soul between spirit
 and psyche. We have to explain why the self-con-
 Modus Operandi scious element at the core of human nature ceases
 temporarily to operate in the veil which separates the physical from the

superphysical, so that man both does and does not "know himself": knows himself when awake only as a physical organism in which damped activities of psyche and defeated longings of soul are lost to view too often, and spirit itself reduced to a simple point of continuity in the space-time manifold. Glib formalism about all of this is not enough. We have to show that though there is truth in psychical research, parapsychology, spiritualism (Spiritism), shamanism, these are but the small beginnings of very great truths yet to be made pedagogically useful.

In short, the concept that man is truly a microcosm and hence may understand and draw upon his sublime resources, can and must be brought into educational use once more, and now on well-documented and contemporary terms.

Man is truly a
Microcosm

In whatever manner this concept may be finally achieved, it is clear that the gap in knowledge of any process relating consciousness (taken atomically) to a complex body is just as great on the physical side as it is on the psychological. Yet physically, such a concept is not impossible. We are forced to entertain it from the facts. Glifford C. Furnas (*Next Hundred Years*, p. 77) collated various estimates of the number of cells in an adult human body, and suggested a million billions (English style—1,000,000,000,000,000,000) as a representative figure. Present estimates vary. The exact number is not important. These are organized initially from one cell, the fertilized ovum. But what is this original cell, with all its daughter body-cells? It is, and each of them is, a

Cells or Wave
Packets

complex of great protein molecules, in mass chiefly carbon, oxygen, hydrogen, nitrogen, phosphorus and sulphur; each of these is composed of electronic units or wave-packets, so that the body is really a complex of units possibly 1.8×10^{28} wave packets instead of 10^{13} or 10^{16} cells.

If one cell leads to the organization of a trillion other cells, there is no reason to doubt that in some unique particle may be the pivot of an ovum's organization, and hence of the whole. This may even be a non-material point, the centre of various gradients, just as in many crystal cells the symmetries focus in a point unoccupied by any ion. Today there is no mathematical difficulty in conceiving a single point through which a given local field of energy can organize material particles, and the local, or individuation field, is established as a biological fact.

In the case of a human body we must further assent to the idea that mind energy is (broadly) like physical energy, and mind organization

(broadly) like biological organisms, even if we conceive the unique atom as being the focus of special properties of the field, more than the physical organism can embody. Biological organisms free, and employ, energies

Release of Mind Energy

at the chemical molecular level. Why should not mind similarly release and use energies at the atomic or sub-atomic level? Only the smallest of atomic breakdowns

would be needed for such purposes of the psychic, and there is ample supply. "Four grammes of hydrogen atoms exceed by three centigrams the helium produced, corresponding, according to Einstein's formula, to the liberation of 7×10^{12} calories", Henry Hubbard, Secretary of the United States Bureau of Standards, observes (*New International Encyclopaedia*, Supplementary Volume 2, p. 1256, 1930).

And just as there is plenty of energy for mind, there is also of room for mind; the distances between the particles of a human body when taken proportionately to the particles' diameters are on a solar scale, and what may go on psychologically between the physical particles is anybody's—and certainly the Hindus' and Plato's—right to surmise. And (finally), if it seems that the stage-by-stage reduction of organic and psychic systems to a final monadic point of consciousness surrounds that point with a complex which it can hardly be expected to control successfully, the reply is that this is exactly what we can observe in human conduct: We are the intimate witnesses of a vast going-on in ourselves. The intimacy

The Task of Self-awakening

leads us to suppose we have self-control. Freud (to begin with) makes clear we do not really possess this at the libido level, at least. Any physiologist knows

how little we control bodily processes, and that little only through psychic intervention. As for control of our soul powers, we surely have scarcely begun the task of self-awakening. We have taken over a little responsibility to exercise and feed our bodies. But the task of directing our psyches and souls we still feebly resign to the unknown. Modern man is in the case opposite to that of Prometheus: chained in psyche to mounting desires, while free a little in body. But, like Prometheus, he may be a

The Duties of Educators

Titan and venture to assault the heavens and to know the whole. Educators who pursue that course in their present and pressing duties of curriculum revision are

likely to be justified of their faith.

MAN AND THE UNIVERSE

THE SELF AND THE NOT-SELF

BY GASTON POLAK

IT seems very easy to distinguish the Self, that is to say, our real being, ourselves, from what is not ourselves ; to distinguish our inner consciousness from what does not belong to it ; but a less superficial examination of the matter shows us that it is not as easy as it looks.

If the idea of our Ego were so simple, there would not have been written on the fronton of the Delphic temple the sentence, " Know thyself ". Even the existence of the Self has been questioned by certain schools of philosophy, and it is curious to note how the two great religions which were born in India have, in this respect, adopted two exactly opposite standpoints.

For Hinduism, especially in the philosophy of the Upanishads and in the Vedanta, which inspires it, the Self, the " Atman ", is everything ; it may even be identified with " Brahman ", the world-soul. In one of the oldest Upanishads, the *Chandogya Upanishad*, in the sixth chapter, there is a very characteristic dialogue between Uddalaka and his son Svetaketu, in which all the examples conclude with the famous sentence, *tat tvam asi*, " thou art That ", that is to say, thy soul is one with the All.

In the *Brihadaranyaka Upanishad*, there is a speech made by Yajnavalkya to his wife Maitreyi, according to which, if one loves one's wife, one's husband, one's sons, or riches, or even the gods, it is not for the sake of these beings or things, but only for the sake of the Self, of the Atman, since the Self is everything.

In Buddhist philosophy, on the contrary, we find the opposite attitude. The belief in the existence of the " Self ", of the Ego, the *satkayadrsti*, or *atmadristi*, is condemned almost as strongly as the real heresy, materialism. This condemnation, however, is not universal, and, in this respect,

there are two schools in Buddhism: the Pudgalavadins, who admit the existence of a *pudgala*, a permanent Self, and the Skandhavadins, or phenomenologists, who deny this. For the Skandhavadins, what we call the "I", the Ego, is only a bundle of attributes, of *skandhas*, which disintegrate on the death of the body. There are, it is true, other schools, which restore to the Ego its relative reality, in the negation of all reality—the Self is an illusion in a whole set of illusions:—which is the theory expressed under diverse forms, by the Sautrantikas or "instantaneists", or by the idealists and the nihilists of the "Great Vehicle", the Madhyamikas. You probably know the parable which illustrates this negative attitude:

Other Schools of
Thought

There was once a man, a monk in fact, troubled by that type of ophthalmia called "timira": he saw in his alms-bowl, hair and flies; in vain did he endeavour to take them out. A passer-by, whose eyesight was normal, examined the bowl, and saw nothing in it, it was empty.

"What are you doing?" he asked.

"I am taking out hair and flies", said the monk.

"But there are neither flies nor hair in your bowl", answered the other.

The seer, exempt from the vision or the non-vision of hair, represents the Lord Buddha, endowed with the real truth, since the true nature of things is not to exist, not to be "produced". The man with bad sight, but who has been taught by the seer, is the wise man of the Great Vehicle. The doctrine of the vacuum, the Sunyata, is the crowning point of that line of Buddhist thought.

As a matter of fact, it seems that the Buddha agreed neither with those who maintained nor with those who denied the reality of the Self, but reserved his reply; that is to say, this was one of the numerous questions to which the Buddha refused to answer, because they were outside the problem of salvation, the problem of the chain of misery, and of the breaking of the chain.

From our point of view, we think it is difficult to deny the reality of the Self, but are of the opinion that it is a notion which is extremely relative, because there is no Self conceivable without a not-Self as a contrast and background; relative, because this duality of the Self and the not-Self varies with the evolutionary level of the individual. For the savage, the primitive man, the Self is his body, his senses, his arms and legs, the whole physical

The Self and the
Not-Self

support of his joys and his appetites; the not-Self is all that is not his body. For the man who has learned to think a little, and who no longer identifies himself completely with his physical body, the Self becomes his psychic being, his desires and his aversions, his joys and his sorrows, his loves and his hates: his body does not belong to the Self, but enters the realm of the not-Self; on the other hand, this man extends the range of his Self much further than the former man, for, through love he learns to be united with other beings, through appreciation of beauty he learns to respond aesthetically to scenes which would leave indifferent and untouched the man whose interests were solely centred in his body.

Then comes a further stage: this is the one described by Descartes in his famous sentence *Cogito, ergo sum*, that is, "I think, therefore I am". For Pascal also, as we know, man is a "thinking reed".

Man has learned to identify himself with his thinking principle: he has learned to dominate, by means of the mind, his body and his emotions, which are no more the kernel of his Self; and, moreover, he extends infinitely further the sphere of his actions. Through his mental self he becomes in tune with all the thinkers he understands, whether they belong to the present or to the past.

But there exists a still higher faculty. It rises within us, in our too rare moments of deep self-recollection, or of a great wave of enthusiasm; but it is constantly present with some of the pioneers of humanity, the great sages, the great mystics, etc. This faculty, which has sometimes

Intuition been called "intuition", dominates reason and mind, just as mind dominates the emotions. At this level, the mind itself belongs to the "not-Self", but thanks to this higher faculty, by impersonal love, and by a wonderful attunement of his vibrations, man enters in direct communion, from within, with a much larger portion of humanity than it was possible for him to contact through the mind.

As we see, there exists an endless ascension of Selves, and not-Selves, in succession. Each time, the I, the Self, becomes a deeper and more interior reality, but, at the same time, the realm of the not-Self, with which the Self comes into contact, becomes larger and richer. In the light of this ascension, one understands better this passage of the *Chandogya Upanishad*:

This Self within the heart is smaller than a grain of rice, smaller than a corn of barley, smaller than a mustard-seed, smaller than a canary-seed or

the kernel of a canary-seed. This Self within the heart is greater than the earth, greater than the sky, greater than heaven, greater than all these worlds.¹

A similar passage is found in the *Brihadaranyaka Upanishad* :

This Purusha (this Self) under the form of mind, being light indeed is within the heart, small like a grain of rice or barley. He is the ruler of all, the lord of all, he rules all this, whatsoever exists.²

Today, in order to express the uttermost smallness, we should use another image than the canary-seed; we should rather say that the Self is smaller than the atom, smaller than the kernel of the atom, smaller than an electron, but nevertheless greater than the universe.³ And this

¹ III. 14, 3, trans. Max Muller.

² V. vi, trans. Max Muller.

³ The following is an elucidation of the statement given in this paragraph.—Ed.

A molecule is the smallest particle of matter which exists in the free state.

"The molecule of water has a diameter of 1.8 hundred-millionths of an inch (4.6×10^{-8} Cm.), while that of the simpler hydrogen molecule is just over a hundred millionth of an inch (2.7×10^{-8} Cms.)". Scientists adduce a number of proofs to show that the molecules really exist. "As molecules are so exceedingly small, they must also be exceedingly numerous. A pint of water contains 1.89×10^{25} molecules, each weighing 1.06×10^{-24} ounce. . . . If we think of the molecules as tiny seeds, the total amount of seed needed to sow the whole earth at the rate of 100 million molecules to the square inch could be put into a pint pot."* Now atoms are smaller than molecules and electrons and protons are smaller than atoms.

"Molecules which constitute the ordinary air of an ordinary room move with an average speed of about 500 yds. a second. This is roughly the speed of a rifle bullet. . . . It is the high speed of molecular motion that is responsible for the great pressure exerted by a gas . . . with each breath we take, swarms of millions of millions of millions of molecules enter our bodies, each moving at about 500 yards a second, and nothing but their incessant hammering on the walls of our lungs keeps our chests from collapsing under the hammering of the molecules of the air outside."†

"In ordinary air each molecule collides with some other molecules about 3,000 million times every second, and travels an average distance of about 1/60,000 inch between successive collisions. . . . In the lowest vacua which are at present obtainable in the laboratory, a molecule can travel hundreds of yards without colliding with any other molecule, although there are still 600,000 million molecules to the cubic inch."†

And what is true of molecules within a cubic inch of gas is equally true of atoms in a molecule and of electrons within an atom. One can imagine what the immensity of space would be in the microcosmic world *relatively* to the infinitely small size of the molecules, atoms and electrons.

* *The Universe Around Us*, by Jeans, p. 101, 4th edition, 1945.

† *Ibid.*, p. 102.

last similitude would be invested with quite another meaning than the one it could have taken in the time of the Upanishads.

* * * *

Since the universe represents the extreme term of the range of not-Selves, it may be of interest to know how modern
 Scientific View mathematical astronomy describes this universe. Since these notions are not as yet very currently understood, it may not be superfluous to try to give here a short abstract of them.

The actual aspect of the universe is at the same time larger and smaller than formerly: larger, since the distances we speak of are incomparably greater than in the past; smaller, because formerly the universe was supposed to be infinite, by means of the imagination, the boundaries of the world could be indefinitely expanded, whereas, according to the astronomy of today, the universe is not infinite.

It is the study of the far-off spiral nebulæ, a study *rendered possible by means* of the powerful instruments of Mount Wilson, which has mostly contributed to modify our ideas concerning the world.

Each of these nebulæ, when seen through the telescope (either
 Galaxy directly, or, more generally, by means of a photographic plate) resolves itself into an immense system of stars; each one is a partial universe as, for example, the Milky Way in which our sun is situated. They are therefore called "galaxy" after the Greek word *galaxias*, milky.

According to Eddington, the probable number of these galaxies is a hundred thousand million, and each of them contains, on an average, a hundred thousand million stars, so that the number of stars in our universe should be represented by 10 followed by 22 zeros.

How distant are these galaxies from us? If we take as a unit the
 Distance in Light light-year, that is, the distance which light, at a speed
 Years of 300,000 km. (or 186,300 miles) per second, travels in a year, we conclude that the nebulæ we have been able to discern are at a distance varying from 1 to 150 million light-years.

The calculation of these distances has been simple for some of the nearest galaxies. It has been found that some stars, with a periodically varying light, like the Cepheid Variables for instance, have a standard light-power, constant for a given period. If a galaxy contain a star of this type, it is then easy to calculate the distance of the star, and thereafter

that of the galaxy containing it, by comparing its known light-power with its apparent brightness.

For greater distances, however, less satisfactory methods have needs been employed, and the distances assigned to the remoter galaxies are, of course, only approximate.

Stars were formerly considered as fixed heavenly bodies. We shall see that recent discoveries have greatly modified our former views in this respect.

Astrophysics, thanks to the spectral analysis of the stars, has allowed us to reckon fairly exactly the *radial* velocity of the nebulae and of the stars, that is to say, the speed at which the galaxies are moving towards or away from us in the line of vision.

For this purpose, the Doppler-Fizeau effect, of which a very simple example can give us an idea, has been employed. If an engine, a locomotive, is whistling while it comes towards us, the sound of the whistle will not only appear louder, it will also be higher in pitch. On the contrary, if the engine is receding from us, the whistling will be deeper in pitch, and this modification of the sound from the deeper to the higher pitch, enables us to calculate the velocity with which the engine is travelling away from us or towards us. A similar process exists in the case of light, but here, instead of a higher pitch there is a modification of the colour towards violet, and in the case of a deeper tone, a modification towards red.

If therefore, the rays of a known element, in the spectrum of a star, are shifted towards the red, this fact proves that the star is travelling away from us. It is travelling towards us if the rays are shifted towards the violet.

Now, two elements, hydrogen and potassium, are found everywhere. Their spectral rays, easy to detect, are perfectly well known.

Very accurate measurements have shown that, with the apparent exception of two or three galaxies located in our almost immediate neighbourhood, all the other galaxies, all the spiral nebulae, are travelling away from us.

The astronomer Hubble has found that this speed of regression or flight of the galaxies increases proportionally to their remoteness from us. This velocity of regression is approximately 500 km. per second, for a distance of 3.5 light-years.

If we apply this law of proportion to the nebula which is situated in the constellation of Gemini, we find that this nebula is travelling away from us at a rate of 25,000 km. per second, that is, almost with the same speed as the *alpha* particles of radium.

We need not conclude from this curious statement that the galaxies are fleeing from us, or avoiding our Milky Way as though it were an especially undesirable region. As a matter of fact, the galaxies are not fleeing from our galaxy, but from one another just as much as from us. There is a very simple explanation of this. Suppose that, without our moving from our chairs, our lecture-room were to expand to twice or thrice its present size. The seats would all be separate one from another in the same proportion, and each one of us could quite easily believe that our neighbour was moving away from ourself.

Or, observe the smoke rising slowly from the pipe of a placid smoker. When, in the air, this smoke expands, each particle of it will necessarily move away from its neighbouring particle.

And this suggests a very simple interpretation: suppose that, for some mysterious and unknown reason, the space containing these myriads of spiral nebulae, were expanding like the smoke alluded to; then each of the nebulae, like the particles of smoke, would automatically move away from the other nebulae. Does this not remind us of Gitche Manito, the God of the Redskins, the Great Spirit, so well described by Longfellow, who ruled the world smoking his peace-pipe?

The Expanding
Universe

And the smoke rose slowly, slowly,
Through the tranquil air of morning,
First a single line of darkness,
Then a denser, bluer vapour,
Then a snow-white cloud unfolding,
Like the tree-tops of the Forest,
Ever rising, rising, rising,
Till it touched the top of heaven,
Till it broke against the heaven,
And rolled outward all around it.

And so the whole universe would expand, as a gas expands. This expansion of the universe doubles the distances of the nebulae from us, according to Eddington, every 1,300 million years, and according to the French astronomer Mineur, every 2,000 million years.

It would be impossible, without a rather arduous mathematical apparatus, to explain here how astronomers account for this expansion, but we can say that the theory of relativity has to some extent foreseen this interesting fact.

The astronomy of our youth knew only Newton's law of gravitation, according to which the worlds attract each other with a force proportional to their mass, and inversely proportional to the square of their distances. But the theory of relativity provides for the existence of another force,

Cosmic Repulsion which could be called *cosmic repulsion*, which is proportional to the mutual distances. This repulsion is entirely neutralized, or rather hidden, by the Newtonian attraction, for the distances which we generally consider, for instance, inside our solar system or inside a galaxy. But in the case of distances which reach millions or hundreds of millions of light-years, this repelling force becomes so great that the Newtonian attraction becomes practically non-existent.

The comparison of the universe to an expanding gas, or smoke, is indeed a charming similitude, but it meets with certain difficulties. The farthest galaxies we know today are about 500 million light-years distant from us; however, there are no theoretical reasons for not admitting much greater distances still; and, in this case, the increasing speed of regression could finally reach or even surpass the speed of light.

In order to avoid this scandal (scientifically speaking), a boundary must be put to the universe, and this can best be done if we consider the universe as a closed world, a gigantic sphere. I have given here only one of the reasons for such a solution, but of course it is not the only one.

The universe is, therefore, a sphere; but not the sort of sphere that we know. The space in which our universe is moving has at least four dimensions instead of the three (length, width and height) we know, and even this number of dimensions must be increased if we admit the continuum called space-time.

It is useless to strain our imagination in order to try to visualize a space with four or six dimensions; it is enough to reason from analogy, and to use the words "*N*-dimensional space" as a handy notation.

Let us imagine first the sphere to which we are accustomed, for instance, a terrestrial globe. The distance, let us say, between London and Glasgow, will be represented by a very short line, and a very small surface would be sufficient to represent Great Britain. But if the radius

of the sphere were doubled, the surface would become four times greater than before, and London would become much more distant from Glasgow.

For the astronomers of today, our whole universe is similarly the three-dimensional (but that is unimportant) surface of an enormous sphere, a sphere with more than three dimensions, (but, again, that is of no matter). The apparent regression of the nebulae is the result of the expansion of the space in which they are situated, and this expansion of space, in turn, depends upon the lengthening of the radius of the world-sphere. At this point, another image, even more expressive than that of the smoke, comes naturally to our mind: an iridescent soap-bubble, blown by a child at play, which floating in the air slowly grows in size until it bursts. Our universe is like a soap-bubble, the radius of which has doubled in 1,500 million years.

The radius of this bubble is today approximately 3,000 million light-years long. Of course, with the means actually at our disposal, we have not been able to explore the whole (three-dimensional) surface of this sphere. The surface known at the present time, compared with the total surface, is like the surface of France compared with the surface of the earth.

How and when has this dispersion of the galaxies begun? Here, opinions differ. For some people, it is by the spontaneous expansion of our universe. For others, (for instance, Lemaître), this expansion has been provoked by an external cause. At all events, it seems that in the initial state of things, the two opposing forces, Newtonian attraction and cosmic repulsion, were equally balanced, and that this rather unstable equilibrium was at some time thrown out of gear.

For certain astronomers, Eddington for instance, the system will go on expanding for ever. The radius of our universe will continue to grow till the bubble bursts, although one does not see quite clearly to what such a bursting corresponds, in the case of a universe. For other scientists, such as the Dutch astronomer De Sitter, our universe is an "oscillating" one. Our universe-sphere having started with a comparatively small radius, has gradually expanded, and this expansion will continue some thousands of millions of years still, and then, an opposite process will intervene, and the universe will begin and go on contracting, and this alternation or succession of expansions and contractions will continue for immeasurable ages.

The Universe,
a Soap-Bubble

The Oscillating
Universe

In the treatise of Henri Mineur, *L'Univers en Expansion*, we find an interesting diagram, showing the various possibilities of growth and contraction, according to De Sitter.

* * * *

Is it not strange to note that these quite recent conceptions concerning our universe are not so far distant from the most ancient and apparently most naïve ones, describing our world in the form of an egg? We read in the *Laws of Manu* :

When the Lord Svayambhu, (self-existing) decided, in His mind, to emanate from His substance the various creatures, He produced first the waters, in which He laid a germ. This germ became an egg, shining like gold, and in which the Supreme Being was Himself born in the form of Brahma, the father of all beings.

In *The Secret Doctrine* of H. P. Blavatsky, (vol. I, part II), Section VI is entitled "The Mundane Egg." According to H. P. Blavatsky,

in the Egyptian *Ritual*, Seb, the God of Time, is spoken of as having laid an Egg, or the Universe . . . The Mundane Egg was placed in Khoom, the Water of Space, or the feminine *abstract Principle* : . . . Ra, the Mighty One remains in his Egg, during the struggle between the "Children of the Rebellion" and Shoo, the Solar Energy and the Dragon of Darkness.

We see the egg also intervening in the Orphic and the Dionysiac mysteries : . . . Porphyry also shows it to be a "representation of the world".

"This first-born of the World" was Dionysus, with some Greeks, the God who sprang from the Mundane Egg. Plato, in his *Timæus*, tells us that the universe is a sphere.

The importance given, in religion and symbology, to certain birds, is due to the fact that they lay eggs. Such is the case for Kalahansa, the Swan of Eternity, in India, or for the Ibis, in Egypt. Even Christians have to this day their sacred birds ; for instance, the Dove, the symbol of the Holy Ghost.

In the *Orphic Hymns*, Eros-Phanes evolves from the Divine Egg. . . . The Egg was sacred to Isis : Isis is almost always represented holding a Lotus in one hand, and in the other, a Circle and a Cross.

In the Scandinavian Cosmogony, the Mundane Egg is again discovered in the Phantom-Germ of the Universe, which is represented as lying in the Ginnungagap, the Cup of Illusion, Maya, the Boundless and Void Abyss.

In some of the Stanzas of Dzryan, the world-egg is mentioned. In Stanza III, 3, we read :

Darkness radiates Light, and Light drops one solitary Ray into the Waters, into the Mother-Deep. The Ray shoots through the Virgin-Egg, the

Ray causes the Eternal Egg to thrill, and drop the non-eternal Germ, which condenses into the World Egg.

The commentary to the stanza tells us :

The "solitary Ray", dropping into the "Mother-Deep", may be taken to mean Divine Thought, or Intelligence, impregnating Chaos. . . . The symbol of an egg expresses the fact taught in Occultism, that the primordial form of everything manifested, from atom to globe, from man to angel, is spheroidal, the sphere being with all nations the emblem of eternity and infinity.

Let us also quote paragraphs 10 and 11 of the same stanza :

Father-Mother spin a Web¹, whose upper end is fastened to Spirit . . .
 The Web of the and the lower one to its shadowy end, Matter. And this Web
 Universe is the Universe, spun out of the Two Substances made in
 One, which is Svabhavat (self-existing).

This Web expands when the Breath of Fire is upon it : it contracts when the Breath of the Mother touches it.

And in the commentary we find :

The expanding and contracting of the "Web",—that is, the world stuff, or atoms, express here the pulsatory movement : for it is the regular contraction and expansion of the infinite and shoreless Ocean, of that which we may call the noumenon of Matter, which causes the universal vibrations of atoms.

* * * * *

This immense universe only apparently removes us from man, for
 it was the mind of man which actually formulated it.
 Man Himself an It has built it after its own image. Is not man himself
 Universe a universe, is he not a space in which billions of cells,
 that is of worlds, are evolving? And if this is true of his physical
 being, is it not still more true of his other vehicles
 The Soul of Man of consciousness? Many poets have felt this to be so,
 and have identified heaven with the soul of man. Shelley says in his
 "Ode to Heaven", apostrophizing heaven :

Thou art but the mind's first chamber
 Round which its young fancies clamber.

And a French poet, who bears an almost English name, Francis Jammes, has said :

Lorsque je serai mort, fermez-moi bien les yeux
 Pour qu'au dedans je voie, enfin, briller les cieux :

¹ See *The Web of the Universe*, by E. L. Gardner for further study.—Ed.

which could approximately be translated :

And when ye shall have found me dead
Close ye well mine eyes :
That, from within, my Soul may see
The Splendour of the Skies.

In the Gospels, many parables are devoted to the kingdom of heaven, and this heaven is not only the paradise of the devout people, it is also the divine Self in man. And it is in this sense that the parables find their most profound significance.

The kingdom of heaven is at the same time that which is smallest and that which is greatest, and Jesus uses in this connection an image very similar to the *Chandogya Upanishad* :

The Kingdom
of Heaven

The kingdom of heaven is like to a grain of mustard-seed, which a man took and sowed in his field . . . which is indeed the least of all seeds : but when it is grown, it is the greatest among herbs, and becometh a tree, so that the birds of the air come, and lodge in the branches thereof.

The kingdom of heaven is a precious jewel : it is like to a pearl, for the acquisition of which a merchant sold all that he had. [Note here the symbol of the pearl, again a sphere.]

Like to the Self, the kingdom of heaven penetrates and vivifies all things, that is, it is

like unto leaven, which a woman took and hid in three measures of meal, till the whole was leavened.

Jesus even gives us a "technique", or method, for the conquest of the Self, or of the kingdom of heaven :

The kingdom of heaven is like unto a net that was cast into the sea, and gathered fish of every kind ; . . . which, when it was full, they drew to shore, and gathered the good, but cast the bad away.

Man is indeed an eternal fisher : constantly we cast, in the ocean of life, the net of our deeds, of our desires, and of our thoughts. Most of these material or immaterial activities are vain, and the net we draw ashore is almost empty, or filled with a useless booty. However, from time to time, we fish a feeling of devotion, a thought of understanding, an act of sacrifice, a sentiment of love, and at each such time we come a little nearer to the kingdom of heaven, to the divine Self in us.

This kingdom, this deepest Self, can only be approached by dint of simplification, of purification, and that is why, in order to enter the kingdom of heaven, we must become as little children, and lose all the complications of our actual inner life.

Become as Little
Children

But above all, to become as little children—this means, having passed through a new birth, a birth into the spiritual life; and this spiritual life is nothing else than the *living* understanding of the Unity that binds us to all men and to the rest of the world. This Unity may be intellectually perceived as a universal law, a supreme synthesis of ever and ever greater laws. This road is being trodden by the man of science, and especially by the physicist. Mie, one of the commentators of Einstein, says :

The Unity of Life,
Intellectually
Perceived

The recent developments of physics lead us to recognize everywhere in nature a principle of profound unity.

But this Unity can also be felt : it is no more the mind which reasons, but love which is aglow. It is this sense of Unity which made St. Francis of Assisi sing his so-called " Hymn to the Sun " :

This Unity of Life
Can Also Be Felt

Praise to Thee, my Lord, for our Brother the Sun, for our Sister the Moon, and the Stars . . . for our Brother the Wind, and for the Air and the Clouds : . . . for our Sister the Water . . . for our Brother the Fire . . . for our Mother the Earth . . . for our Sister the corporeal Death.

Whatsoever be the chosen path, the path of the scientist or that of the mystic, man will only have accomplished his mission on earth when he has found his real Self, when the great lesson of universal Unity has been thoroughly learned, when he is able to say with the philosopher Fouillée :

In my heart shall beat thy heart and all hearts :
My throbbing shall be the throbbing of the whole universe.

GEOLOGY¹

BY A. F. KNUDSEN

THERE is no branch of science which gives so grand an idea of the immensity of time as geology. Similarly, does the science of astronomy display the grandeur of the immensity of space. The mind begins to reel as the Ancient Wisdom, of which Theosophy is the present embodiment, reveals the figures in millions of years as regards the origin of earth and of man. The Adepts and Sages *know* these figures to be true as a result of their researches extending over thousands of years. These figures have been more or less confirmed by the clairvoyant and scientific investigators of the present century. The truth of clairvoyant research can no more be proved to the general public, than colour can be demonstrated to a blind man. Clairvoyance is a fact. (See the monograph on *Archæology* in Part I of this Series.)

There was much opposition to the figures given by H. P. Blavatsky from the scientists of last century. But *modern* science is a great ally of Theosophy for it approaches more and more the figures in the theosophical literature as regards the age of the Earth and of Man. The explorations of modern archæologists and the researches of geologists, palæontologists, biologists, anthropologists, physicists and astronomers of our own days have vindicated the most ancient records in ascribing to our earth and its inhabitants a period of existence of vast extent and of marvellous complexity.

¹ This article is more or less a brief compilation from the original monograph of the author (the late Mr. A. F. Knudsen, over the title "Geology and the Secret Doctrine Compared") and other sources shown in the bibliography at the end. For further clarification, a perusal of the monographs on "Archæology", Part I and "Evolutionary Biology", Part II of this series is recommended. The Editor gratefully acknowledges the help he received from these sources in the revision and compilation of this monograph, particularly from the relevant portions in *The Secret Doctrine*, by H. P. Blavatsky, (1888), *Man: Whence, How and Whither*, by Annie Besant and C. W. Leadbeater, and *The Earth and its Cycles*, by E. W. Preston.—Editor.

"Hundreds of millions of years are tossed together to give time for the slow and laborious processes of nature; further and further back 'primeval man' is pushed; Lemuria is seen where now the Pacific ripples, and Australia, but lately rediscovered, is regarded as one of the oldest of lands; Atlantis is posited where now the Atlantic rolls, and Africa is linked to America by a solid bridge of land . . . Poseidonis is no longer the mere fairy-tale told by superstitious Egyptian priests to a Greek philosopher; Minos of Crete is dug out of his ancient grave, a man and not a myth; Babylon, once ancient, is shown as the modern successor of a series of highly civilised cities, buried in stratum after stratum, glooming through the night of time. Tradition is beckoning the explorer to excavate in Turkestan, in Central Asia, and whispering of cyclopean ruins that await but his spade for their unburying."¹

The Motions of the Earth The rotation of the earth round its axis gives on an average a day of twenty-four hours' duration, causing the phenomena of day and night. The revolution of the earth round the sun is completed in a year's duration, causing the different seasons of the year. But the earth has a third motion also over and above its rotation and revolution. The whole solar system including the earth is whirling in space at a tremendous speed in the direction of the Constellation of Lyra. The whole solar system begins its journey at a certain point of time, from a certain point of space, with a particular given order of things and a particular configuration of heavenly bodies all around, and finds that it has completed its big Cycle of millions of years² when it returns to the same state of conjunction from which it started. This was noted by the early Hindu astronomers, as evidenced in *Surya Siddhanta*, Chapter I.

Four Ages According to *Surya Siddhanta*, Chapter I, our evolution is divided into four Yugas (Ages or Cycles) and takes place through seven Races of Man. Of the four Yugas, the Kali Yuga (Iron Age) is of the smallest duration, and of the races, sub-races and family races, a family race is the smallest division. "As each of the seven Races is divided into four Ages—the Golden, Silver, Bronze and Iron—so is every smallest division of such Races."³

¹ *Man* : p. ii. (See abbreviations.—Ed.)

² This may be 4,320,000,000 years (One Day of Brahma) or 311,040,000,000,000 years (one age of Brahma). Vide infra.—Ed.

³ S. D., II, 208.

The period of 43,200 years' duration is supposed to be the smallest cycle. Bigger than that cycle would be one of 432,000 years; one still bigger would be 4,320,000 years, and bigger still would be one of 43,200,000 years' duration. This period constitutes one World Period and is made up of ten Maha Yugas. A Maha Yuga means a great Cycle or Age. As ten Maha Yugas make one World Period, so do seven Root Races also make one World Period. (Tables 2 and 3). This means that seven Root Races of men are born to fulfil their destinies in the world and this will cover a period of 43,200,000 years. But each Root Race has its own four Yugas on its own smaller scale.

The relative lengths of the four ages are given as 4:3:2:1,¹ corresponding respectively to Golden, Silver, Bronze and Iron ages. This means that the Bronze Age is twice as long as the Iron Age, Silver Age three times as long and the Golden Age four times as long as the Iron Age. This indicates that the total period of all the four ages combined will be 10 times as long as that of the Iron Age or Kali Yuga, as shown below: (4+3+2+1=10.)

TABLE I

Golden Age	(Krita or Satya Yuga)	...	1,728,000 years ²
Silver Age	(Treta Yuga)	...	1,296,000 years
Bronze Age	(Dvapara Yuga)	...	864,000 years
Iron Age	(Kali Yuga)	...	432,000 years ³
Total			4,320,000 years ⁴

TABLE II⁵

One Kali Yuga (Iron Age)	...	432,000 years
One Maha Yuga	...	4,320,000 years
One World Period (10 Maha Yugas)	...	43,200,000 years
One Day of Brahma (or 1 Kalpa)	...	4,320,000,000 years
One Age of Brahma (or 1 Maha Kalpa)	...	311,040,000,000,000 years ⁶

¹ S. D., III, 356 and S. D., II, 321.

² S. D., II, 73.

³ S. D., II, 580.

⁴ I. U., I, p. 32.

⁵ S. D., II, 73.

⁶ "It is only in the Indian Shastras that time is measured from so minute a part as paramanu or 1/160,000th part of a second up to a Maha Kalpa, 311,040,000,000,000 years." (*The Theosophist*, p. 344, July 1936.)

The period of 4,320,000 years is called a Maha Yuga ; this Maha Yuga is ten times bigger than the Kali Yuga. And so we get Table II which may be read side by side with Table III which treats of Races, World Periods, Rounds and Chains, as they are all inter-linked.

Table II shows that 10 Kali Yugas or the total of the four Yugas as stated above constitute one Maha Yuga, 10
 A Day of Brahma Maha Yugas make one World Period and 100 World Periods or 1000 Maha Yugas constitute one Day of Brahma.¹

" These ciphers are not fanciful, but founded upon actual astronomical calculations ", as has been demonstrated by S. Davis, in his " Essay in the Asiatic Researches ", and in Higgins' " Anacalypsis ". " Higgins justly believed that the cycle of the Indian system, of 432,000, is the true key of the secret cycle ". . . . A knowledge of " one of the oldest traditions of antiquity as to the evolution of our planet is necessary in order to demonstrate that the notions which the ancients entertained about dividing human history into cycles were not utterly devoid of a philosophical basis ". . . . " The division of the history of mankind into Golden, Silver, Copper [Bronze] and Iron ages, is not a fiction. We see the same thing in the literature of the peoples. An age of great inspiration and unconscious productiveness is invariably followed by an age of criticism and consciousness. The one affords material for the analyzing and critical intellect of the other. . . . Let us bear in mind that the *heliocentric system came to us from upper India* ; and that the germs of all great astronomical truths were brought thence by Pythagoras."²

The scheme of Cosmogogenesis and Anthropogenesis as given in
 The Earth Scheme *The Secret Doctrine* is grand and marvellous. The contemplation of such a grandiose scheme calls forth awe and wonderment, praise and admiration. A tiny portion of that scheme is our Solar System of which the Solar Logos is the Ruler. The solar system comprises ten schemes of which one is the Earth Scheme with which, or, to be more exact, with a part of which we are concerned in this monograph. The vast scheme of evolutionary process is based on recurrent septenary systems. They are represented by the following table :

¹ For further explanation, see S. D., II, 69-73, 208, 321-323 ; I. U., I, 30-35 ; and E. & C. 52-55.

² I. U., I, 30-35.

TABLE III

7 Sub-Races	...	1 Root-Race
7 Root-Races	...	1 World-Period
7 World-Periods	...	1 Round
7 Rounds	...	1 Planetary Chain
7 Planetary Chains	...	1 Scheme of Evolution or Planetary Scheme. ¹

As we have seen above, one World-Period is of 43,200,000 years' duration (see Table 2). The Planetary Logos, the great Being in whom, and of whom, and to whom, a Planetary Chain exists, is the Ruler of the Earth Scheme. The complete evolution of our Planetary Scheme comprises seven planetary chains successively brought forth, each chain being, as it were, a reincarnation of the preceding one. Three of these chains belong to the past; the fourth is the Terrene, that of which the earth forms the fourth globe; (see diagram 1) the remaining three have yet to appear.

Diagram Explained The Terrene chain, in its turn, comprises seven globes or worlds which form the field of evolution during the planetary chain or Manvantara. (vide infra.) The first three of these globes—generally known as A, B, and C—form a descending arc, the densest physical matter of the descent being reached in the fourth globe, D, which is our earth in the Earth chain. In the 4th or Earth chain, C and E globes with our Earth as D are physical and are respectively Mars and Mercury. B on the descending, and F on the ascending, arcs are astral and A on the descending, and G on the ascending, arcs are lower mental in the Earth chain. A, B, F, and G, are invisible to ordinary sight. (see diagram 1)

A manavantara (Sanskrit Manu-antara, the period between two Manus) is a cycle of manifestation as opposed to Pralaya, or non-manifestation. It includes the seven rounds of the great Life-wave of the Logos. The Pralaya is the "winter" between the rounds of the Life-wave. The great "Life-wave" from the Source of all Being, vivifying successively the seven globes that constitute a planetary chain, is spoken of technically as a "Round". Three Rounds of the globes have been made and the fourth is in progress now, the life being concentrated on globe D as stated above. (see diagram 1)

¹ *The Web of the Universe*, by E. L. Gardner, p. 101.

PERIOD OF QUIESCENCE OR PRALAYA OR
"WINTER" BETWEEN THE
ROUNDS OF THE

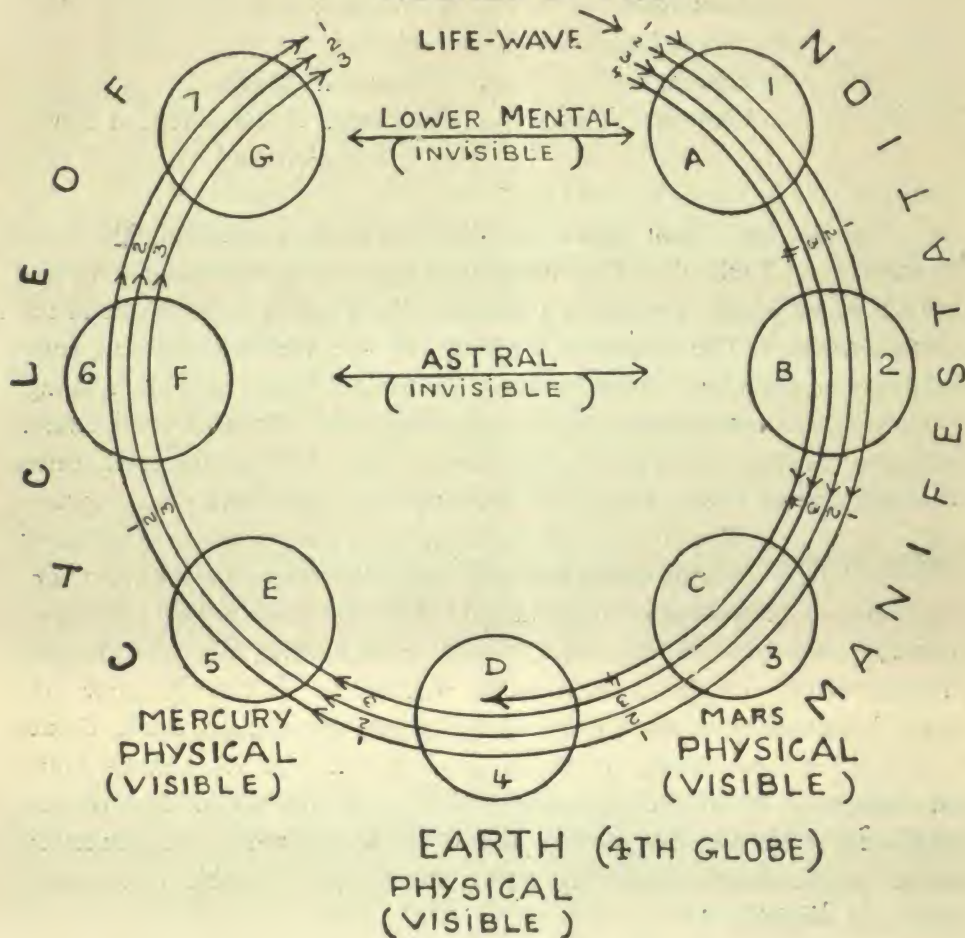


DIAGRAM 1

The Earth Chain

In periods of sevens the evolution of the races of man may be traced, and the actual number of the worlds which constitute our system and of which the earth is one, is seven also as we have seen above. There are, again, seven kingdoms of nature: the first three are elemental kingdoms of which science is not yet aware; the remaining four are the mineral, vegetable, animal and human

kingdoms.¹ Man belongs to a kingdom, distinctly separate from that of the animals, including beings in a higher state of organization than that which manhood has familiarized us with as yet. Man is evolved in a series of rounds (progressions round the series of worlds from A to G and back to A after a "winter" between the rounds on a higher spiral), and seven of these rounds have to be accomplished before the destinies of our Earth Scheme are worked out. An individual unit, arriving on our Earth globe for the first time in the course of a round, has to work through seven races before he passes on to the next globe of our Earth chain, and each of those races occupies the earth for a long time.

We shall be better able to understand the true significance of the tables and maps given in this article if we admit and remember the following Esoteric Axioms:²

Esoteric Axioms:

- (a) The existence and enormous antiquity of our Planetary Chain.
- (b) The actuality of the Seven Rounds.
- (c) The separation of human races (outside the purely anthropological division) into seven distinct Root-Races, of which our present European Humanity is [forms part of] the Fifth.
- (d) The antiquity of man in this [Fourth] Round. And finally,
- (e) That as these races evolve from etheriality to materiality, and from the latter back again to relative physical tenuity of texture, so every living (so-called) *organic* species of animals, with vegetation included, changes with every new Root-Race.

"The more powerful your telescope, the more stars you will see. And thus through the most powerful telescope now at the disposal of man (the Mount Wilson telescope) not less than about one and a half milliard or 1500 million stars can be observed."³ The spectroscope and the camera detect and reveal many more. "As to the distances between them, they are incalculable."⁴ Is then our microscopical Earth—a "grain of sand on an infinite seashore"—the

¹ See *Anthropology*, Part III, of this Series.—Ed.

² S. D., II, 737.

³ *The Universe in Space and Time*, by Prof. G. Van Den Bergh, translated by John C. H. Marshall and Th. de Vrijer, p. 285.

⁴ See Section on Astrophysics in the preceding monograph on *Man and the Universe*, this part.—Ed.

only centre of intelligent life? Our own Sun, itself 1,300,000 times larger than our Planet, sinks into insignificance beside the giant Sun, Sirius, and the latter in its turn is dwarfed by other luminaries in infinite Space.¹ The Adepts *know* that almost all the Planetary Worlds are inhabited. Unconsciously, perhaps, in thinking of a plurality of inhabited "Worlds", we imagine them to be like the globe we inhabit, and to be peopled by beings more or less resembling ourselves, and in so doing we are only following a natural instinct. It is well to remember the deductions which Flammarion formulates, in this connection, from the known *facts* and laws of science.¹ They are:

1. The various forces which were active in the beginning of evolution gave birth to a great variety of beings on the several worlds; both in the organic and inorganic kingdoms.
2. The animated beings were constituted from the first according to forms and organisms in correlation with the physiological state of each inhabited globe.
3. The humanities of other worlds differ from us, as much in their inner organization as in their external physical type.

What has modern science got to say on this subject?

Sir James Jeans writing in 1941 in *A Treasure of Science* (Harper & Brothers) on "Is there life on other Worlds?" after describing the physical conditions of different planets, says: . . . "yet as the physical states of other planets are so different from our own, it seems safe to say that any life there may be on any of them must be very different from the life on earth".

"If it is once proven that there are inhabited Worlds besides our own, with humanities entirely different from each other as from our own—as maintained in the Occult Sciences—then the evolution of the preceding Races is half proved. For where is that Physicist or Geologist who is prepared to maintain that the Earth has not changed scores of times, in the millions of years which have elapsed in the course of its existence; and that changing its "skin", as it is called in Occultism, the Earth has not had each time her special Humanities adapted to such atmospheric and climatic conditions as were entailed by such change? and if so, why should not our preceding four and entirely different Mankinds have existed and thrived before our Adamic Fifth Root Race?"²

¹ S. D., II, pp. 747-48.

² S. D., II, 749.

We may say that we at present living on this earth—there are people of the Third and Fourth Races also—are now going through the Fifth Race of our present Fourth Round on the Fourth Globe of our Fourth Chain. With this background and in this perspective, we shall be in a better position to understand the subject of this monograph and to interpret the Chart showing the correspondences, more or less close, between rounds and eras respectively of *The Secret Doctrine* and modern Science, as also between the other features shown therein.

How old the earth really is, how long has man walked this earth "erect" and truly biped, are questions that long have troubled the minds of men.

This monograph is an effort to bring together in small compass the traditional side and the modern scientific conclusions. The traditions as to the earth's age are many and are listed here. The age of the earth as given in *The Secret Doctrine* is corroborated by the Hindu and Telugu calendars and also by modern astronomy and astrophysics.

- | | |
|---|--------------------------------------|
| (a) According to <i>The Secret Doctrine</i> (in 1888) | 1,955,884,687 years |
| (b) According to Swami Dayanand Saraswati. | 1,972,948,982 years |
| (c) According to Hindu Puranas | ... 1,972,947,077 years |
| (d) According to Telugu Calendar | ... 1,972,948,987 years |
| (e) According to Sir James Jeans (1929) | ... 2,000,000,000 years |
| " " (1947) | ... 2,000,000,000 years ¹ |

The Secret Doctrine of Madame Blavatsky was a challenge to all intellectual men to find agreement, or disprove her claims. At least part of the agreement is shown here, and invites a closer study. Let the reader note that the life in mineral, vegetable, animal and man, is the same, the Immortal Life, therefore spoken of as "Man" (*Man*)² in whatever form it is made manifest. It culminates in the form

¹ Pp. 313-314, *The Growth of Physical Science*, by the late Sir James Jeans (1947).

This agreement as regard the age of the earth was first pointed out by E. W. Preston in her book "*The Earth and Its Cycles*" in 1931—Ed.

² Vide the big Chart.

called man. It may clarify the idea to say, the spirit is man, the form is human.

The re-statement of the ancient traditions, as maintained both orally and through books by the Occult Hierarchy of this planet, has been promulgated through The Theosophical Society, and the principal book of that re-statement is *The Secret Doctrine* by H. P. Blavatsky, 1888. That date is very important. But the teaching began in 1875 and she had been up in Tibet.¹

The science of Geology growing out of a marvellously careful study of the rocks, the chemistry, the physics, the zoology of this globe and its solar system, gives us a remarkably accurate picture of the previous life of the globe. We find the life divided into Eras and as we place these records side by side with those given in *The Secret Doctrine*, we notice that there is a remarkable correspondence.² These parallel columns are shown in the big chart. In this chart, again, the mythical avatārs of Vishnu are placed in the right hand column, *tentatively*, as a subject for consideration by the students, in the order given there as they are supposed to "trace the gradual evolution and transformation of all species". . . . "Nor do we see less clearly carried out in this succession of avatārs, the truly philosophical idea of a simultaneous spiritual and physical evolution of creatures and man."³ This is the ancient Indian way of teaching great scientific truths in symbolism.

The Avatāras shown in the Chart are :

- (1) Matsya or Fish Avatāra,
- (2) Kurm or Tortoise Avatāra,
- (3) Varaha or Boar Avatāra,
- (4) Nara-Sinha or "man-lion" Avatāra,
- (5) Vamuna or "Dwarf" Avatāra (first step toward the human form),
- (6) Parashu-Rama or "Rama with the Axe" Avatāra (represented as a hero but yet an imperfect man, inclined more on the destructive side),
- (7) Ramachandra or an ideal king Avatāra (represented as a perfect approximation to Godhead),

¹ *The Brothers of Madame Blavatsky*, by Mary K. Neß.

² This was first pointed out in E. & C. in 1931.

³ I. U., II. 274-76.

CHART

THE AGE OF THE EARTH AND OF MAN

PARALLELISM OF LIFE

CORRELATION OF

GEOLOGIC ERAS AND REVOLUTIONS WITH THEOSOPHIC ROUNDS AND PRALAYAS

T H E O S O P H Y			Time in Million Years ⁴ (Approx.)	S C I E N C E		
BIRTH AND GROWTH OF THE EARTH				ERAS ⁴	PERIODS ⁴	BIRTH AND GROWTH OF THE EARTH
2000 M.Y.	Temperature High		2000 to 3000	AZOIC (No Life)	Archean	NO LIFE
Life latent and unconscious [*]	Copper (gaseous) above 3500°	Molten Rocks				NO FLORA
	Green Scum at the Poles		Earth in a Molten Condition			
FIRST ROUND	Evolution of the Etheric Prototypes upto Man :	(Nature begins with mankind on the arc of descent, hardening and materialising forms)		CRYPTOZOIC		Igneous Rocks
	(Man) ¹ Cloudy, Etheric			ARCHEOZOIC		
MINERAL KINGDOM	(Man) ¹ Amaeboid					No Recognizable Fossils
	(Man) ¹ Mineral Form					
Fire Element ²	No Traces of Fossils	1st Pralaya				
1200 M.Y.	Rapid Cooling Down		1200	PRE-CAMBRIAN (Primitive Life)	Middle Precambrian	Fall in Temperature
Individual sentient Life	Solid Rocks Forming					Metals become Liquid, then Solid
	Copper (liquid)		1000	PROTEROZOIC		Igneous Rocks solidified (Granite Formation)
	Copper (Solid)					The Earth Still Hot
SECOND ROUND	Forest-like Growths					DAWN OF LIFE
	Heavy Choking Atmosphere					Sedimentary Rocks Forming
	Warm Mud				Upper Precambrian	Larval Life
VEGETABLE KINGDOM	(Man) ¹ Etheric					Sedimentation began in Europe (Huxley) (1000 M.Y. ago)
	(Man) ¹ Vegetable Form					Age of Algae and Primitive Invertebrates
	No Traces of Fossils					Primitive Plant Life
						Grasses
						Molluscs
						A few Fragmentary Fossils
Air Element ²		(2nd Pralaya)		Killarnean Revolution	Great Break	Remarkable Upheaval of the Earth's Crust
680 M.Y.			640		Cambrian	Trilobites
			600		Ordovician	Rise of Fishes and Land Plants
					Silurian	Rise of Lung Fishes
					Devonian	Rise of Amphibians, Marine Fishes and Land Floras
THIRD ROUND	" Sedimentation began approximately over 320 million years ago " (S.D., II, 754)		420	Caledonian Revolution		Age of Marine Invertebrates
	Large Swamps			PALÆOZOIC (Ancient Life)		Matsya or Fish Avatāra ³
	Fern Forests—Large Coal				Carboniferous	Age of Fishes
	Reptilian Animals		200			Kurm or Tortoise ³ Avatāra
	Half-Bird, Half-Reptile			Appalachian Revolution	Permian	
RISE OF THE ANIMAL KINGDOM	Scaly Birds		180			
	Reptiles				Triassic	Rise of Dinosaurs and Reptilian Mammals
	Man ¹ (Gorilla-like and Soft-bodied)		140	MESOZOIC (Medieval Life)	Jurassic	Marsupials, Ichthyosaurs
						Age of Amphibians and Primitive Floras
						Dominance of Dinosaurs
						Rise of Flying Dragons and Birds
			100			Age of Reptiles
	Left No Traces					Extinction of Dinosaurs
	(Man) ¹ Animal Form				Cretaceous	Rise of Archæic Mammals
Water Element ²		(3rd Pralaya)		Laramide or Alpine Revolution	Great Break	Varaha or Boar Avatāra ³
						A rapid Diminution of Fauna dwindling to 300-400 Species
50 M.Y.	Repetition of the Conditions of the Earlier Rounds		60		Eocene	Vanishing of the Age of Reptiles
	Intense Volcanic Activity					
	Ape-like Creatures (Primitive)	Mammalian Type				Primitive Monkeys and Lemuroid Creatures
						Nara-Simha or "man-lion" Avatāra ³
						" The Appearance of a teachable Type of Life " (Wells)
FOURTH ROUND	First Root Race (Borean) (Etheric Form) (43 M.Y.)		40		Oligocene	Living Orders
	Second Root Race (Hyperborean) (Form Still Etheric) (' Pudding-bag ' Type) (26 M.Y.)					
						Age of Mammals and Flowery Plants
EVOLUTION OF THE HUMAN KINGDOM	Third Root Race (Lemurian) Gradual Densification of Form (Human-Gorilla in Form) (18 M.Y.)		20	CAINOZOIC (Modern Life)		Appearance of MAN
Appearance of Man	Man, ¹ Egg-headed and Soft-bodied (The Continent of Lemuria)				Miocene	Living Genesis
	Beginning of the Destruction of Lemuria by Volcanic Fires		10			Age of Vamana or Dwarf Avatāra ³ (first step toward the human form)
Division of Sexes	Began (16½ M.Y.)					
	Completed (10-11 M.Y.)					
	Fourth Root Race (Atlantean) (Red Race) Gradual Improvement of Form (The Continent of Atlantis) (5 M.Y.)		5		Pliocene	Living Species
	Fifth Root Race (Aryan), Preparation for: (1 M.Y.)					Parashu-Rama or "Rama with the Axe" Avatāra ³
Main Continent of Atlantis destroyed by Water ³	... 800,000 years ago (1st Catastrophe)		1	ANTHROPOGENIC	Pleistocene or Glacial (Diluvial) or Palæolithic	Age of Man
Further breaking up of Atlantis into Ruta and Daitya ³	... 200,000 .. (2nd ..)					AGE OF MAN
Submergence of Ruta and Daitya ³ about	... 83,000 .. (3rd ..)					
Establishment of the Fifth Race (Aryan)	... 80,000 ..					
Man as we know him (Sexual Physical Man)	Modern Races—Improvement of Type					
	1st Sub-Race (Indian) 60,000 B.C.					
	2nd .. (Arabian) 40,000 ..					
	3rd .. (Iranian) 30,000 ..					
Submergence of POSEIDONIS 9,564 B.C.	4th .. (Keltic) 10,000 ..					
Last Fragment of the Atlantis ³	5th .. (Teutonic) 8,000 ..					
	6th .. (In Process of formation)					
	(Present Times)			PSYCHOZOIC (Recent)		Age of Reason
						Ramachandra, as a perfect approximation to Godhead ³
Earth Element ²					HISTORIC	Krishna or "man-God" Avatāra ³

¹ Vide pp. 77-78, Geology Monograph.

² S.D., I, pp. 272-273.

³ Vide diagrams 10, 11, 12.

⁴ Not drawn to Scale.

⁵ S.D., I, 278.

⁶ Evolution according to Hindu mythology. This is the ancient Indian way of teaching great scientific truths in symbology.

(8) Krishna or "man-God" Avatāra (A Teacher with authority).
And, finally, will appear

(9) Kalki-Avatāra in the future, to establish righteousness on Earth.¹
This chart will be of great help in understanding what follows :

The period that geology calls Archaic is also known as Azoic, Rounds and Eras "without life", but towards the end of it life might have existed, and that period is called Archeozoic. This is an exact parallel with the First Round. The duration of this round cannot be determined definitely for "We have no knowledge at what time precisely the evolution and formation of our little earth began."² The second Round is named by science the Proterozoic : in it the world began to cool off, life began to show, and at the end of it there are some definite fossils showing fairly solid shells of various types of molluscs, primitive plant life such as algæ, etc. But even at the end of this Round the earth was very hot. Science puts the close of this Era at a very remarkable upheaval of the earth's crust. That comes in the Cambrian Period and separates now the Upper Cambrian ; this ends the Proterozoic Era and can be accepted as the end of the Second Round. The following two groups of Eras are the Palæozoic and Mesozoic ; taking them together they correspond closely with the Third Round. The *rock* revolution here called the Alpine or, in America, Laramide Revolution coincides perfectly in every way with the beginning of the Fourth Round. From that time to this present time, we have the Cainozoic Era which obviously is not finished. This is our Fourth Round and we are in the middle of it. There is some argument though as to how much of this Round remains to us (vide infra).³

Let us turn now to the chronology. *The Secret Doctrine* (1888) gave the age of this planet as 1,955,884,687 years. Sir James Jeans⁴

¹ See also F.P.T., 276-78.

² S.D. I, p. 227.

³ Charts showing this correspondence were first given in E. & C. to which the reader is referred.—Ed.

⁴ Sir James Jeans in the fourth and last Edition of *The Universe Around Us* (1945) gives the following figures for the Age of the Earth by the Radio-active Clock, page 155.

- | | | |
|--|---|--------------------------------|
| 1. From the lead-uranium ratio in radioactive rocks | } | more than 1750 millions years. |
| 2. From the relative abundance of uranium and actino-uranium | | } |
| 3. From the relative abundance of the isotopes of lead | } | |
| 4. From the lead content of igneous rocks | | } |

says about the age of the earth: "The radioactive products in the oldest of terrestrial rocks were analysed, and were found to assign ages of nearly 2000 million years to these rocks." (P. 314, *The Growth of Physical Science*, by the late Sir James Jeans, 1947) So the Proterozoic Era and the second Round began about 1,200 million, the Palæozoic and the Mesozoic Eras and the Third Round began about 680 million, and the Cainozoic Era and the fourth Round about 50 million years ago.¹

"Although not in exact agreement, these Rounds and Eras coincide far too nearly to be mere accident. . . Both Occult and Scientific authorities agree as to the age of the earth, the earth having passed through the same series of *cycles and rhythmic changes*. The durations of the Rounds correspond fairly well with those of definite geologic Eras."² The difference seems to be due to science trying to follow time-calculations while occultism follows the drastic changes in the types of the

living forms. After the great heat in the Proterozoic Era or second Round, which began about 1,200 million B.C., the earth cooled off rapidly. Metals (for instance, Copper) became liquid, then solid, quartz burning at a great heat produced granite, and thus in every way rocks were formed and the earth became habitable. H. G. Wells says, "Passing from the Proterozoic Era to the Cambrian (Palæozoic Era), is like passing in human history from a time of shadowy legend to one of well-preserved written record".³ In other words, the rocks from that time to this have been tilted, raised up into mountains and eroded, but remain the consecutive pages of a book, and in these the fossils are as written words.

The third great life-span includes the Palæozoic and Mesozoic Eras and covers about 600 million years.⁴ In this the animal form evolved from the molluscs to the worm, from the worm to the vertebrate, as fish; then, when the plants of the coal measures took the carbon out of the air, the first land animals appeared, even lung-fish appeared, and we still have amphibian saurians that can live in the air or under water at a moment's notice, the newt.

¹ E. & C., p. 45.

² *Ibid.*, pp. 27-28.

³ Quoted from E. & C., p. 38.

⁴ *Ibid.*, p. 39.

Through the Upper Carboniferous, the Permian and especially in the Triassic and Jurassic Periods, the fossils show some ten thousand species of plant and animal. An enormous change from the Palæozoic types comes with the Permian Period. The Triassic forms are quite different from the previous fauna. Gigantic saurians abound; marsupial mammals are very numerous. Birds improve in form and lightness, but are as hideous as dragons.

Towards the end of this Period, the last third of the Mesozoic Era, we find the Cretaceous Period, an enormous series of sedimentary rocks, all containing lime or even pure chalk. It took animals to get the chalk out of the water. The tiny creatures evidently cleared both fresh water and the oceans of these immense quantities of chalk. But even some larger shells, the nummulites, form enormous beds of nummulitic lime-stone of this period from the Alps to the end of the Himalayas. With that came the Earth revolution¹ that raised the Rocky Mountains and the Alps. This is one of the periods when the life-wave passed from this globe to another globe of the Chain for a considerable period and returned; with that return we have a new era and a new round. The time of the revolution was from 43 million to 60 million B.C. (calculated from Professor Schuchert by E. W. Preston).

The Cretaceous period is in great evidence all over the world, but reaches its greatest thickness of strata on the Pacific coast. In Northern California, in the Chico Period, these strata, four or five miles in thickness, extend from the Pacific coast almost to the Rocky Mountains and run some eight hundred miles north over the State of Oregon as well as California. These strata are like the strata of the Permian Period, almost completely devoid of fossils. Again we have the phenomenon of approximately ten thousand species dwindling to three or four hundred. This period is closed by an enormous revolution known in America as the Laramide (indicating the rise of the Rocky Mountains) and the Alpine in Europe, which can be traced from France across Southern Europe, Asia, into and through the length of the Himalayas. This crumpling of the earth's surface can probably be traced

¹ "A partial cataclysm occurs at the close of every 'age' of the world, they say, which does not destroy the latter but only changes its general appearance. New races of men and animals and a new flora evolve from the dissolution of the precedent ones." (I.U., II, p. 424).

to the Malayan Peninsula and the large islands, south-ward to Australia.

The Withdrawal
of Life

H. G. Wells speaks of this revolution in his *Short History of the World*, and he says "Truly, there is a veil here still, over even the outline of the history of life."¹ The scientists are all at a loss as to the reason for the vanishing of the age of reptiles. The Dinosaurs, Pleisiosaurs and Ichthyosaurs and Pterodactyls have vanished. Some say, "The cold has killed them".² The Occultists, knowing there is an Inner Government of the world, see another *Pralaya* "the withdrawal of life."

The latter end of this Cretaceous Period running along until the Eocene Period is a very difficult record to unravel both for the Geologist and the Palæontologist. There seem to have been a large number of separate oases, where life went on gradually to its end making very disconnected records. These are scattered all over America, Europe and Asia, and are too numerous to mention here.

Cainozoic
(Tertiary) Era

Suddenly we are, as in the Jurassic period, in a new world, the Eocene, the first period of the Cainozoic Era. First of all come entirely new shell-fish, new plants, new fishes, accompanied by the vanishing of all the old types and the appearance of new: then the animals, some of which were marsupials, but the true mammal comes rapidly into the scene. There are five more periods, the Eocene, the Oligocene, the Miocene, the Pliocene, and the Pleistocene. First the mammals in great quantities; and then man appears.³ Probably fifty million years is about right for this part of the Cainozoic. The occult record says that we are half way through the Fourth Round. See Diagram 1.

Chart tells the
Whole Story

There is a variety of opinion as to the *exact* dates of each period but there is general agreement. The records are there, it is merely a matter of agreeing on their interpretations. The chart given, based on those in E. & C., tells the whole story. Science and Theosophy both believe in cycles of evolution and in the gradual evolution of form into more and more complex creatures from Protozoa to Man.

¹ Quoted from E. & C., p. 42.

Ibid., p. 42.

In the course of long geological time, tremendous changes must have taken place on the surface of the earth. It is generally recognised by science that what is now dry land, on the surface of our globe, was once the ocean floor, and that what is now the ocean floor was once dry land. "The history of the earth's development shows us that the distribution of land and water on its surface is ever and continually changing. . . . During the course of many millions of years, ever since organic life existed on the earth, land and water have perpetually struggled for supremacy. Continents and islands have sunk into the sea, and new ones have arisen out of its bosom. Lakes and seas have been slowly raised and dried up, and new water basins have arisen by the sinking of the ground. Peninsulas have become islands by the narrow neck of land which connected them with the mainland sinking into the water. The islands of an archipelago have become the peaks of a continuous chain of mountains by the whole floor of their sea being considerably raised".¹

The two main theories to explain the distribution of land and water masses on the earth resulting in the formation of continents and oceans are

- (1) The old theory of the "Bridging-Continents" supposed to have been submerged forming the present ocean basins and
- (2) The "Displacement Theory" so ably propounded by Alfred Wegener.

"The supporters of the 'Bridging-Continents' hold that the close affinity of fauna and flora of widely separated continents prove the existence of extensive land connections in the past. It is regarded as certain that there was a land connection, sometimes broken, between North America and Europe which finally broke in the Glacial Period²; a similar one between Africa and South America which vanished in the Cretaceous Period; a third the 'Lemurian' bridge between Madagascar and India which broke down at

¹ Ernst Haeckel: *History of Creation*, Vol. 1, p. 360, quoted from *The Lost Lemuria*, pp. 1-2, by Scott-Elliott.

² Lewis Spence presents on p. 42 of his book *The Problem of Atlantis* his own conclusions based on geological evidence and says: "The Atlantean Hypothesis is based on evidence of the most irrefragable character."

the beginning of the Tertiary Era; and finally a 'Gondwana' bridge from Africa through Madagascar and India to Australia which split up during the Mesozoic Era somewhere in the earliest Jurassic. Also formerly a land connection must have existed between South America and Australia (a bridging-continent in the Southern Pacific)".¹ (See Diagram 2).

Wegener's Dis-
placement Theory

"The most prominent component of Wegener's 'Displacement Theory' is the assumption of great horizontal drifting movements which the continental blocks underwent in the course of various Geological Eras, and which presumably continue even today. . . . According to this theory millions of years ago the South American Continental Plateau lay directly adjoining the African Plateau forming with it one large connected mass. The first split, which possibly occurred in the Cretaceous Period, separated them into two parts, which later on drifted like floating icebergs farther and farther apart: particularly the South American Plateau more westward. Similarly North America was also close to Europe; and, probably from Newfoundland and Ireland northward, they formed with Greenland one connected mass. This block broke up by a *forked rift* near Greenland at the end of the Tertiary Era (Diagram 3) and farther north even little later—Quaternary Era. Afterwards the continental blocks moved apart from one another. . . . It may also be assumed that Antarctica, Australia and India lay side by side with Africa; and until the beginning of the Jurassic Period these together with South America formed a single large, partly submerged at times by shallow waters, continental block which during the Jurassic, Cretaceous and Eocene Periods split up and crumbled into smaller blocks which drifted from one another in all directions. The three maps of the Earth (Diagrams 4, 5, 6) give an idea of these developments during the late Primary, Tertiary and Quaternary Eras. India was originally connected by a long continental area, partly covered by shallow seas, to the Asiatic Continent. In the Lower Jurassic time India was separated from Australia and during the Upper Cretaceous time it was separated from Madagascar." (See diagrams 4, 5, 6.)

¹ Dr. A. S. Kalapesi: *Evolution of the Earth and the Formation of Continents*, (1939), pp. 21-22. See the next monograph on *Archaeology*, which further elaborates this point.—Ed.

² Dr. A. S. Kalapesi: *Evolution of the Earth and the Formation of Continents*, (1939), (pp. 7-8). *The Problem of Atlantis* by Lewis Spence, pp. 43-44.

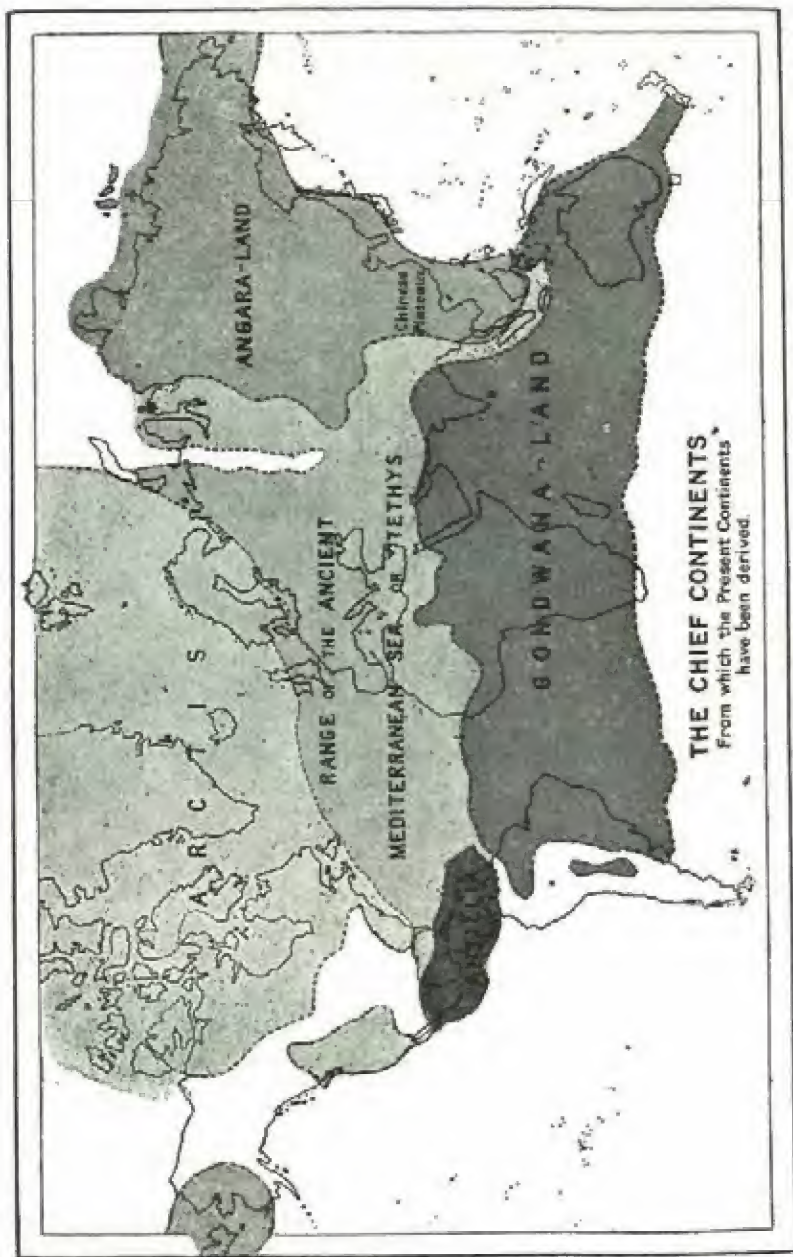


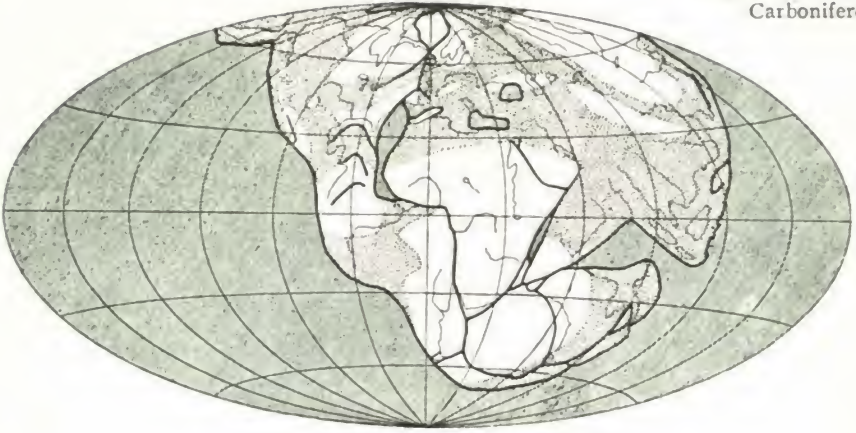
DIAGRAM 21

A Map to Illustrate the Hypothesis of 'Bridging-Continents'.

Note that the re-elevation of these former land masses will so raise the water-level as to submerge all the existing Continents except high mountains.

¹ By courtesy of Dr. A. S. Katapeli and the Summer School of Geography Teachers (1939). The Editor is grateful to them for diagrams 2 to 6.

Upper
Carboniferous



Eocene



Older
Quaternary



DIAGRAMS 4, 5, 6

Reconstructions of the map of the world for three periods according to the 'Displacement Theory'. *Lined*—Oceans; *Dotted*—Shallow Seas. Present-day outlines and rivers only for the purpose of identification. Latitude and Longitude arbitrary (being that of contemporary Africa).

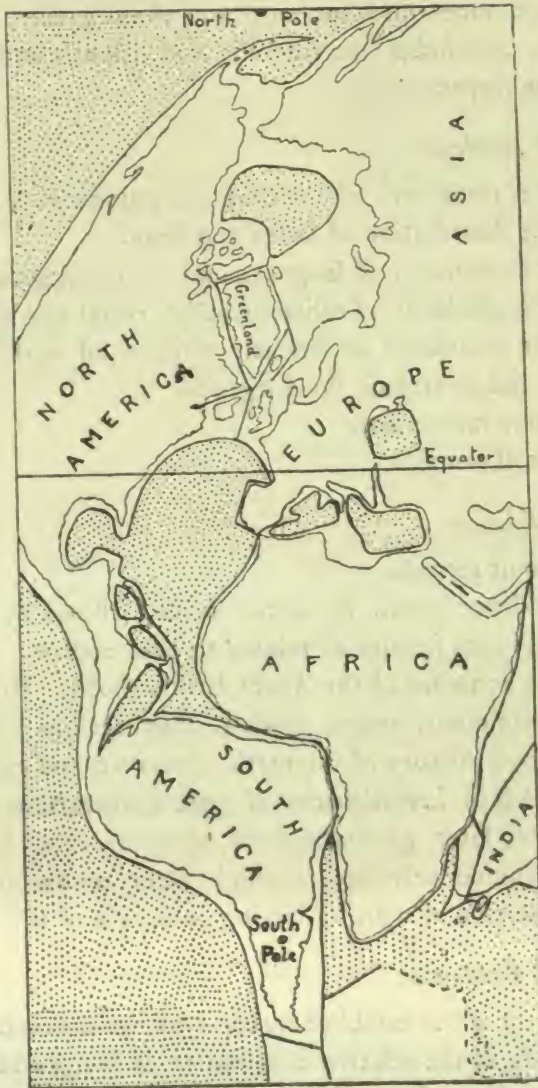


DIAGRAM 3

The Atlantic Lands in the early Tertiary Era.

The Atlantic Ocean began to open during the Tertiary and was not fully developed until the Quaternary. The positions of the North and South Poles are those which they are supposed to have occupied during the early Tertiary. Dotted areas are sea.

The following sources supply further corroborative evidence of the distribution of land and water over millions of years through long past ages, of the development of the earth, its flora and fauna, its inhabitants, animal and human, of the

existence of past races and sub-races and of the great civilizations which flourished on big continents like Lemuria and Atlantis and their destruction by fire and water respectively.¹

Scientific Evidence :

1. The testimony of the deep-sea soundings. (See diagram 7'.)
2. The distribution of fauna and flora.²
3. The similarity of language and of ethnological type.³
4. The similarity of religious belief, ritual and architecture.⁴
5. The testimony of ancient writers, of early race traditions,⁵
and of archaic flood legends.
6. Stone monuments.
7. Fossil remains.

Occult Evidence :

1. Occult records.
2. Evidence given by seers ; (facts gathered by the use of clair-voyant faculty as related to past events).
3. The museum of the Adept Brotherhood. (It contains fossils, skeletons, maps, models, manuscripts, illustrative of the past history of the earth, preserved and constructed by the Adept investigators of past civilizations for the guidance of later generations of students who have earned the unique privilege, through utter renunciation of self and service of man, of having an access to it.)⁶

Geological Evidence :

The object is "to establish by the evidence obtainable from Geology and from the study of the relative distribution of living and extinct animals and plants, as well as from the observed processes of physical evolution in the lower kingdoms, the facts stated in *The Secret Doctrine* and in other works with reference to these now submerged lands", namely Lemuria and Atlantis.

¹ For fuller information on the subject, a reference to the Bibliography at the end is requested.

² F. P. T., p. 45.

³ W. Scott-Elliot : *The Story of Atlantis*, pp. 3 & 4.
See also pp. 4 to 16. *ibid.*, for evidence in detail.

⁴ F. P. T., p. 44.

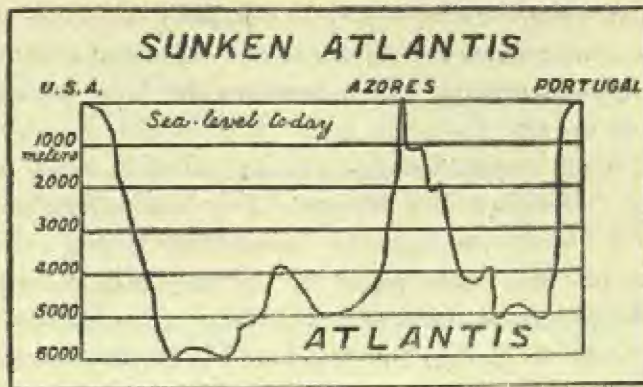


DIAGRAM 7

The testimony of the deep-sea soundings.

Deep-sea soundings¹:

Deep-sea
Soundings

"The bed of the whole Atlantean ocean is now mapped out, with the result that an immense bank or ridge of great elevation is shown to exist in mid-Atlantic. . . . The ridge rises almost sheer about 9000 feet from the ocean depths around it, while the Azores, St. Paul, Ascension and Tristan d'Acunha are the peaks of this land which still remain above water."² Thanks chiefly to the expeditions of the British and American gunboats, *Challenger* and *Dolphin* (though Germany also was associated in this scientific exploration) that the mapping was made possible.

The distribution of fauna and flora :

"The proved existence, on continents separated by great oceans, of similar or identical species of fauna and flora is the standing puzzle to biologists and botanists alike. But if a link between these continents once existed allowing for the natural migration of such animals and plants, the puzzle is solved."³

"Lewis Spence tells us that there is in the British Museum a piece of lava dredged from the ocean floor in this area (under the present coastal plains of Georgia), where Atlantis was said to have been. When this was examined it proved highly significant. Its structure indicated that it was a type which had originally emerged from the earth into air,

¹ F. P. T., p. 48. (By courtesy of Mr. C. Jinarājadāsa and the Theosophical Publishing House, Adyar. The Editor is grateful to them for diagrams 7 to 12.)

² W. Scott-Elliot : *The Story of Atlantis*, pp. 3 & 4.
See also pp. 4 to 16, *ibid.*, for evidence in detail.

³ *The Story of Atlantis*, p. 4, by W. Scott-Elliot.

and not under water. From this Spence properly concludes that the land in question was once above the surface of the water, and subsided—perhaps during the very disturbance which produced this lava—after the eruption of the rock into the air.”¹

Further Evidence “The fossil remains of the camel are found in India, Africa, South America and Kansas. The fossil remains of the horse with the various intermediate forms which are the precursors of the true horse found in the fossil beds of Nebraska in the Western Hemisphere and the presence of the horse in Europe. Remnants of the cave lion of Europe are also found in North America.”² Other evidence. Take, for example, the banana plant. It is found on both sides of the Atlantic Ocean. “This plant is not propagated by seed, but by slips. And the tenderness of the slips is such that weeks of transport by water are out of the question to explain the occurrence from Asia to America.”¹ It would therefore be difficult to account for these phenomena except on the hypothesis of continuous land communication between the two continents.

Language :

The Basque language standing alone amongst European tongues, with none of which it has an affinity, resembles in its structure the aboriginal languages of the vast continent (America) and those alone. The link between the two continents is supposed to be the submerged “Atlantis”.³

“The similarity of language among the various savage races of the Pacific islands has been used as an argument by writers on this subject. The existence of similar languages among races separated by leagues of ocean, across which in historic time they are known to have had no means of transport, is certainly an argument in favour of their descent from a single race occupying a single continent.”¹ The continent in question is the lost “Lemuria”.

Configuration of the Earth A glance at the maps (diagrams 9, 10, 11 and 12), prepared by the occult students as stated in (3) above, will show the configuration of the earth at different times in its past history. The dark shaded parts represent land. Diagram 8 shows the world as it is today. It is inserted here for comparison with the maps

¹ Quoted from *The Theosophist* of July 1945, p. 144-145, from the article “The Impending Discovery of Atlantis” by Fritz Kunz and Ruby Lorraine Radford.

² W. Scott-Elliot, *The Story of Atlantis*, p. 5.

³ S. D., II, p. 834. See also W. Scott-Elliot, *The Story of Atlantis*, p. 7.

⁴ W. Scott-Elliot, *The Story of Atlantis*, p. 8.

which follow. Diagram 9 shows Lemuria at its greatest extent and the distribution of land and water more than 10 million years ago. Diagram 10 shows Atlantis at its prime. It shows the configuration of the earth a million years ago, during many previous ages, and upto the catastrophe of about 800,000 years ago. Diagram 11 shows Atlantis at its decadence. It shows the world after the catastrophe of 800,000 years ago and up to the catastrophe of about 200,000 years ago. Diagram 11 again shows Ruta and Daitya, the two islands left after the destruction of the main continent by water. Ruta was submerged about 850,000 years ago and Daitya about 270,000 years ago and other islands forming part of the Atlantis continent sank under water about 75,025 years ago, leaving only the island of Poseidonis, the last fragment of the Atlantis (diagram 12) in the Atlantic Ocean. This island sank under the sea in 9564 B.C., being destroyed by mighty convulsions. For the scientific evidence of the submergence of Poseidonis, see the next monograph on *Archæology* in this Part. The tradition of a great "flood" left in the minds of men is the sinking of this large island in the Atlantic Ocean about 11,000 years ago.

The Submergence
of Poseidonis

"A comparison of the maps given here shows that Australia and New Zealand, Madagascar, parts of Somaliland, the south of Africa and the extreme southern portion of Patagonia are lands which have *probably* existed through all the intervening catastrophes since the early days of the Lemurian period. The same may be said of the southern parts of India and Ceylon, with the exception in the case of Ceylon, of a temporary submergence in the Ruta and Daitya epoch. . . . The other oldest known lands on the face of the earth are Greenland, Iceland, Spitzbergen, the most northerly parts of Norway and Sweden, and the extreme north cape of Siberia. Japan and Spain are shown by the maps also to have been above water."¹

"The South Sea at one time formed a large Pacific Continent, and the numerous little islands which now lie scattered in it were simply the highest peaks of the mountains covering that continent. The Indian Ocean formed a continent which extended from the Sunda Islands along the southern coast of Asia to the east coast of Africa. This large continent of former times Sclater, an Englishman, has called *Lemuria*, from the monkey-like animals which

Lemuria

¹ W. Scott-Elliot: *The Lost Lemuria*, p. 16.

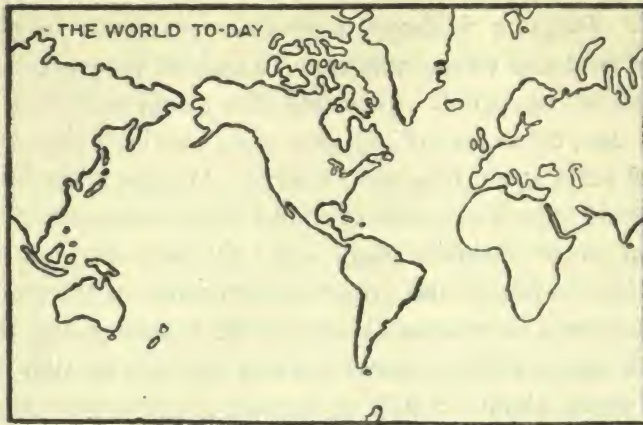


DIAGRAM 8

Showing the World as it is today.

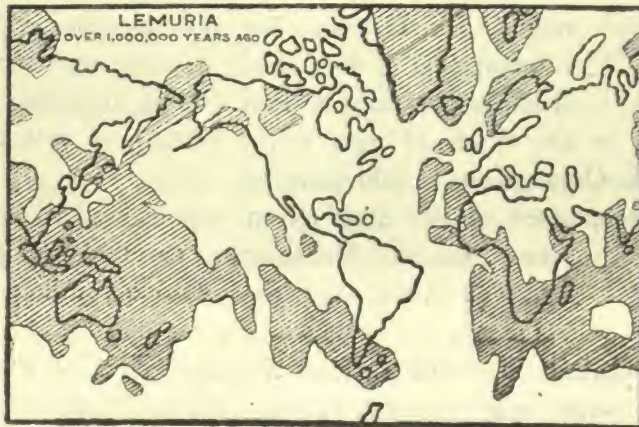


DIAGRAM 9

Showing Lemuria at its greatest extent about 10 million years ago.

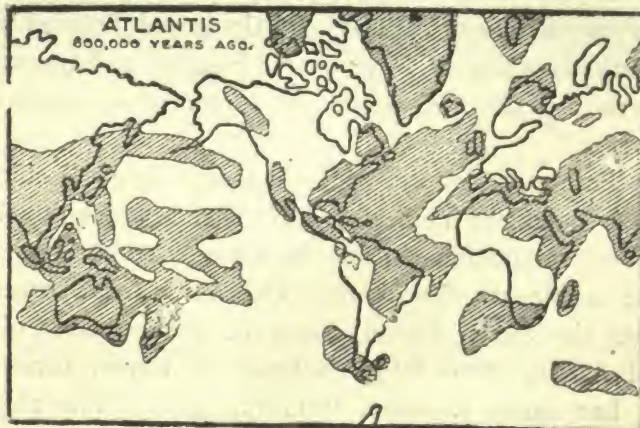


DIAGRAM 10

Showing Atlantis at its prime. It shows the configuration of the Earth a million years ago.

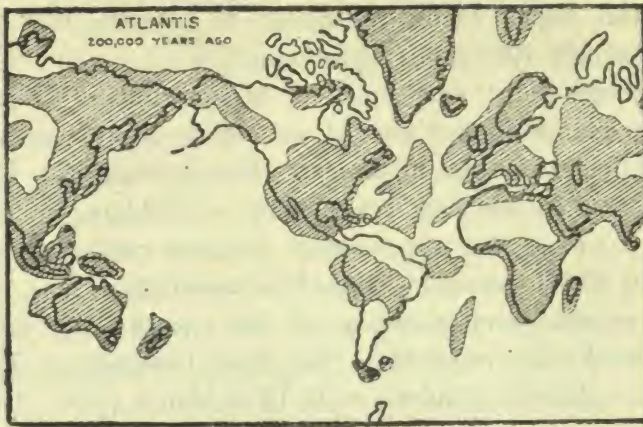


DIAGRAM 11

Showing Atlantis at its decedence. It shows *Ruta* and *Daitya*, the two islands left after the destruction of the main continent by water.

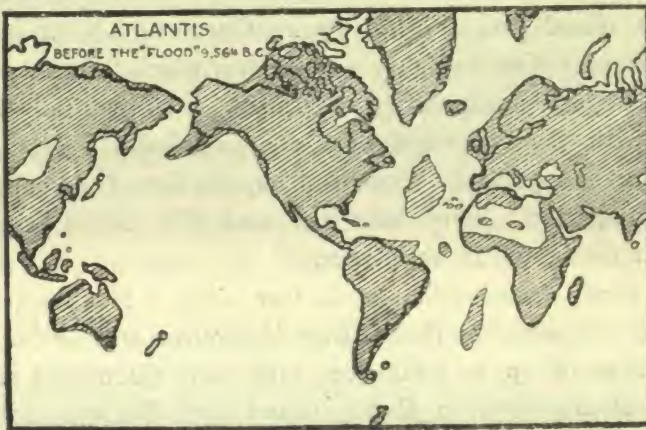


DIAGRAM 12

Showing *Poseidonis*, the last fragment of the Atlantis, before the 'flood' of 9564 B.C. inhabited it, and it is at the same time of great importance from being the probable cradle of the human race. . . ."¹

The statues on the Easter Island in the Pacific Ocean and the colossal statues still erect and intact near Bamian are standing witnesses to submerged continents and to the existence of giant races. "Who made the great stone images which are now the chief attraction of the island to visitors?" . . . "Two of the best of these colossal images are now in the British Museum." "Who cut the Bamian, still more colossal, statues, the tallest and the most gigantic in the whole world?" . . . "The largest is 173 feet high,

¹ *Ibid.*, p. 2. (See also Diagram 2 above.)

or *seventy* feet higher than the 'Statue of Liberty' now at New York, as the latter is only 105 or 34 metres high."¹

Submergence of vast lands or large numbers of people under water or emergence from water of vast lands are phenomena to which we in our times are not unfamiliar. For example, the harbour town of Masulipatam, on the east coast, north of Madras, India, was nearly destroyed by an oceanic wave during the great cyclone of 1st November 1864. About 80,000 people lost their lives overnight.

The second example is that of the rise of a new island from the waters of the Pacific reported in the *News Chronicle* of London by its science editor (Ritchie Calder) on 13/14 of March 1946. It is 200 miles south of Tokyo and is to be called Urania after the British destroyer which discovered it, according to a British Admiralty announcement. (6-4-'46).

"Stories of marvellous discoveries are beginning to come in from some of the island groups in the Pacific Ocean now being invaded by the American armies. One vast city, spread over many islands, with elaborate buildings, bridges, engineering structures, architectural triumphs, all overgrown with tropical vegetation, creepers, baffling description. One house is nine storeys high. Scientific experts have been called in but can offer no explanation. They have not read *The Secret Doctrine* with its account of Lemuria and its early races."²

The most recent discovery is that of a "Mountain Range in the Indian Ocean" reported by Reuter from Melbourne on 18-4-'48. "Uncharted mountains of up to 9,000 feet high were discovered on the floor of the Indian Ocean between Cocos Island and Batavia recently by the British Cable Laying Ship Recorder.

"The Recorder has reached Melbourne after a perilous time repairing submarine cables about 1,700 miles north-west of Freemantle."—*Reuter*.

"A new invention by which the deep places of the ocean may be photographed. The camera is let down by wire and when it comes within 20 feet of the bottom of the sea it automatically begins to take pictures . . . a strange picture from a depth of five miles in the deep off Porto Rico showed what looked like the arched door of a great cathedral. We may thus get testimony of the existence of the lost Atlantis or Lemuria. There is said to be a seven-mile depth off the Philippines; and a similar deep

Deep Sea
Photography

¹ S.D., II, 352-5.

² *The Canadian Theosophist*, 15-2-1945, p. 369.

off Japan. We hope to get more details of this new art of marine photography." (From a Radio Talk quoted from p. 368, *The Canadian Theosophist*, 15-2-1945.)

Deep sea photography will throw a flood of light on the question of submerged continents described by H. P. Blavatsky in Section VII of *The Secret Doctrine*, Part II, p. 822, under the title "Scientific and Geological Proofs of the Existence of Several Submerged Continents."

It becomes increasingly difficult for an unbiassed person or an impartial critic to explain away the cumulative evidences—namely, the geological, archæological, ethnological, cultural, traditional and biological—in favour of former continents now submerged. How very necessary it is to have a proper comprehension of the preceding Lemurian and Atlantean phases of the world in order to have a proper and adequate comprehension of the world as we find it.

Theosophy speaks of seven rounds and of seven races in each round on the globe. The big chart shows that the First Round is the longest and the duration of each round becomes smaller and smaller with the passage of time. We are in the middle of the Fourth Round now on our globe. (diagram 1). Similarly, the duration of each race becomes smaller and smaller. From the data available in theosophical literature on the duration of rounds and races, it can be shown in what time the earth will reach its seventh round in the Terrene chain and humanity its seventh race in our present fourth round. It takes a long time in the First Round for the formation of the Earth Chain Globes out of the matter of the Third Chain. Then evolution proceeds on all the seven globes, only the rate of progress is accelerated as the life wave passes on. Miss E.W. Preston gives in her excellent book *The Earth and Its Cycles*, on pp. 137-38, two graphs showing the relation between Time and Races and Sub-Races in the first graph, and in the other, the relation between the period of growth and the dominance of the sub-races of the fifth Root-Race.¹

To summarise: the object of the monograph is to find out whether the statements given in theosophical literature on this fascinating subject agree with those of modern science and if they do, where and how far. An attempt in that direction has been made here and it will be seen from what has been stated above that in theosophical literature a very much wider and more comprehensive

¹ See also an article by E. W. Preston in the 1938 August Number of *The Theosophist*, giving further graphs.—Ed.

view of the subject is taken than in science. It is gratifying to note that the statements made in the former as regards the age of man and of earth are receiving more or less corroboration from modern science, that the Rounds of occult literature can be compared with the Eras of science, and that the "pralayas" or periods of obscurity or rest, are in fair agreement with the different revolutions and "breaks" observed by scientists

The Need of a
Higher Synthesis

at regular intervals of time. The monograph also reveals that there is ample field for study and research both by students of Theosophy and Science and that they can do a good deal of useful work together in collaboration. The need of the present day is co-operation and collaboration, and an increased understanding of each other's point of view, in order to arrive at a higher synthesis in all departments of knowledge.

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ARCHÆOLOGY

BY G. NEVIN DRINKWATER

INTRODUCTION

MAN is very old ; science has long been prepared to think of his antiquity in terms of a million years or more, and if certain flint implements from France are of Miocene Age as some authorities are prepared to accept, modern estimates of man's age will be some ten millions of years or even more, thus approaching the same order of magnitude as that of the occultists.¹

Though both authorities, eastern and western, may be said to exhibit some measure of agreement as to man's age, it is quite otherwise with regard to the age of civilized man. The occultist speaks of the Golden Age of Atlantis one million years ago,² but western archæology would be reluctant to concede that there was any civilization worthy of the name even 11,500 years ago,³ yet this, according to the occultist, but represents the closing stages of the civilization of Atlantis, the final remnant of which, Poseidonis, is stated to have sunk beneath the waves in 9,564 B.C. just over 11,500 years ago.⁴

There are several reasons for this discrepancy. Western archæology is obliged to accept the existence of only those civilizations for which there is direct evidence such as ruins or reliable literary sources. Without some objective evidence there would be no limit to the hypothetical

¹ *Nature*, vol. 139, p. 994 (1937).

² *The Story of Atlantis*, p. 27 *et seq.*

³ The remarkable cave art of "Stone Age" man in France and Spain is of course much older than this, but though the drawings and paintings would do credit to a modern artist, these men had no knowledge of masonry, pottery, weaving or agriculture, and therefore cannot be considered civilized. Occult research indicates that these people, the Cro-Magnons, were the degenerate descendants of one of the Atlantean races. See *Corroborations of Occult Archaeology*, p. 21.

⁴ *The Story of Atlantis*, p. 3.

civilizations which could be invented, thus violating the golden rule of science that causes are not to be multiplied beyond mental necessity. It is highly probable too that remains of civilizations of exceedingly high antiquity would in most cases leave little or no trace today. Metals if known would have rusted away, and buildings would have disappeared. Pottery, we know from Neolithic and pre-dynastic Egyptian remains, can remain intact for at least 7,000 years, but it is a moot point if it would remain intact for 70,000 years, still less for 700,000 years, even in the exceptionally dry and otherwise favourable conditions in Egypt.

Furthermore, though occult researches suggest that during the period from 70,000 to 11,503 years ago, Atlantis, Central Asia and India¹ have been among the principal cultural centres, comparatively little is known of these areas by archæologists. Atlantis is obviously no longer accessible, and much of Old World archæology has been concerned with Europe and the Near East, Central Asia and even India being little known archæologically as yet, so far as really ancient times are concerned.

At the same time, as we shall see, archæology and its hand-maiden geology are not entirely silent on the data supplied by occult research, and clairvoyant research into the past cannot be dismissed as a mere will-o'-the-wisp. There are grounds for believing that in the next half-century sufficient confirmation will be forthcoming to require the serious consideration of the scientific world, and that eventually the use of trained clairvoyance will be generally recognized as a powerful means of investigating the past.

The writer has already attempted a brief survey and comparison of the occult and scientific approaches to the study of pre-history in *Corroborations of Occult Archæology*. In what follows it is proposed to bring forward new evidence of the sinking of Poseidonis approximately 11,500 years ago and to review some of the more important points raised in *Corroborations of Occult Archæology*. The scientific proof for the existence of the prehistoric Gobi Sea mentioned by occultists will be studied; also the evidence for the remarkable and ancient Sumero-Iranian civilization, whose peoples had originally migrated from the shores of the Gobi Sea to Mesopotamia and Iran, and further that for the prehistoric Arab civilization in East Africa. It should be emphasized that the scientific evidence was forthcoming

Evidence of
Ancient Civiliza-
tions

New Evidence

¹ Other centres of this period are discussed in *Corroborations of Occult Archæology*.

many years after the occult investigations were published. The evidence for Poseidonis and the Gobi Sea is of a geological rather than of a strictly archæological character, but the clairvoyant investigations make such frequent mention of Poseidonis and the Gobi Sea that it is necessary to examine the evidence for their existence if any serious attempt is to be made to assess the value of occult archæology.

Poseidonis and the Gobi Sea, as they were 75,000 years ago, are well shown on the accompanying map, fig. 1. The map is a reduced copy of the original published in 1896 by W. Scott-Elliot from data supplied by C. W. Leadbeater from occult sources.¹ It represents the world 75,000 years ago and the approximate configuration until the sinking of Poseidonis in 9,564 B.C.



FIG. 1

Map drawn by C. W. Leadbeater based on clairvoyant investigations. Showing the world 75,000 years ago but giving the approximate configuration until the submergence of Poseidonis in 9,564 B.C., Published in 1896 by W. Scott-Elliot in *The Story of Atlantis*. (Reduced.)

¹ *The Story of Atlantis*, p. 17 et seq.

THE SINKING OF POSEIDONIS IN 9,564 B.C.

Before proceeding to discuss the date of the sinking of Poseidonis it would be well to review briefly the views held by geologists and others as to the possibility of sunken continents.

During the third quarter of the last century most geologists, following the lead of Dana, Hopkins and Lyell, believed that the earth was solid to great depths and that, apart from minor changes, the oceanic basins and continental masses had occupied their present positions from the earliest times.

In the last quarter of the century a change became apparent. The older view was still held by many but such authorities as Sclater, who coined the name "Lemuria" for the continent in the Indian Ocean,¹ Blandford, Suess, and the famous naturalist Alfred Russell Wallace, at one time a member of The Theosophical Society, had through prolonged study of the distribution of living and extinct forms of life become convinced of the existence of lost continents. Though, on the whole, attention was drawn principally to Lemuria rather than to Atlantis.

Since 1910 a revolutionary view has been put forward by Alfred Wegener and others. On theoretical grounds it is believed that the solid crust is not so thick as had been formerly supposed, and that the continental masses actually float on the liquid or viscous core. Wegener suggested that the geological kinship of the Old World and the New was not due to former land bridges, but that they had originally been joined together and had then floated apart and formed the Atlantic Ocean. Though this hypothesis has received some distinguished support, many geologists assert that it is based on insufficient and discordant data, whilst mathematicians assert that the forces available make large horizontal movements of the continental masses quite impossible.

Of those who do not accept Wegener's view some prefer to await the accumulation of further data before coming to a decision, while others such as Schuchert and the late Von Ihering have definitely committed themselves to the existence of Altantean and other land bridges. Schuchert supposes that the land bridges were relatively small, thinking as he

¹ Occultists and some geologists believe that Lemuria extended into the Pacific.

² See pp. 83-85, this Part.—Ed.

said that it would be "easier to sink smaller continental-like masses than larger ones". Von Ihering on the other hand, in harmony with the occultists, demands the existence of large continental masses in both the Atlantic and the Pacific.¹

Opinions vary as to the geological age of Atlantis, but Termier, Scharff, Simroth and Hull believe that it may have
Ice Age persisted as late as the Ice Age.² This brings it into the range of the period represented by the map. The map is dated 75,000 years ago, but geologists can say with confidence that the Ice Age ended considerably later than that, about 25,000 to 30,000 years ago.³

It should be pointed out that though there are authorities who support the Atlantean hypothesis, this is only a partial approach to the occult statements, because it is not believed that any prehistoric civilization is old enough to have been influenced by Atlantis—even though the latter should once have existed. It is very doubtful if any archæologist would believe that 11,500 years ago man had already built boats capable of crossing the Atlantic, even with the help of Poseidonis as a half-way house. Here, it must be recorded impartially, is a point at which Theosophy and Science do not yet meet.

Science might concede that granting the presence of land bridges, primitive men may have used them long before there was any kind of civilization, but this, at the present stage of scientific knowledge, is *terra incognita*.

Having thus prepared the ground, let us now turn to the evidence for the sinking of Poseidonis.

All over the world ancient sea-beaches above present sea-level may be seen. In some cases a series of these one above the other may be observed representing successive movements of land or sea. The study and co-ordination of these beaches is an exceedingly complex subject. It has engaged the attention of many geologists and is yet far from complete. For instance, the elevation of the land or the lowering of the sea would at first sight produce the same results—the emergence of a beach, but nevertheless it is possible in some cases to distinguish between them.

¹ See his *Die Geschichte des Atlantischen Ozean*, 1927.

² The grounds on which these authorities base their views are summarized in E. W. Preston's *The Earth and Its Cycles*, pp. 82-88. See Bibliography.

³ *The Changing World of the Ice Age*, p. 84.

The subject has been treated in a masterly fashion by Professor R. H. Daly, of Harvard University, in his recent book *The Changing World of the Ice Age*. He points out that following a suggestion first made by him in 1919, it now seems established that during post-Glacial times, that is during the last 25,000 years, there was a sudden lowering of the oceans by about six metres.¹

Professor Daly discusses various hypotheses to explain this lowering but admits that they lack full support.² (Older changes of sea-level due to the expansion and contraction of the ice caps during the Ice Age, alternately locking up and liberating vast quantities of water, do not concern us here.)

The sudden sinking of Poseidonis in 9,564 B.C. affords a simple explanation. As it sank, the enormous volume of water which rushed in to take its place must have produced an immediate world-wide lowering of sea-level. It is possible to calculate approximately how much this would be, and it is found that the calculated lowering of sea-level through the catastrophe of 9,564 B.C. is of the same order of magnitude as the observed one. The details of the calculations will be found in the Appendix. Observe that if the occult statements are correct then such a lowering of sea-level *must* have taken place in post-Glacial time, and that it *must* have been of the order of magnitude noted.

It will be seen that geologists are not able to date this lowering of sea-level more closely than to say that it took place in post-Glacial times, *i.e.*, during the last 25,000 years. Daly is of the opinion that it was about midway in post-Glacial time, which would bring it into general agreement with the occult date.³

There is, however, evidence of a different kind which supplies a closer approximation to the sinking of Poseidonis.

On theoretical grounds there are reasons to suppose that if a portion of the earth's crust were depressed, the land surrounding the area of depression would be *elevated* to some extent.⁴ This is a local effect and

¹ *The Changing World of the Ice Age*, p. 157, *et seq.*

² *Ibid.*, p. 48.

³ *Ibid.*, p. 181.

⁴ The land would rise under the influence of two distinct processes known technically as plastic and elastic recoil.

The deep-seated viscous material under the area of depression would be squeezed outwards and would cause an upward pressure beyond its borders. See *The Changing World of the Ice Age*, p. 119 *et seq.* Elastic recoil would operate as follows: It seems reasonable to

is quite distinct from the world-wide lowering of sea-level just discussed.

The Rising of Land It follows that if a large mass such as Poseidonis sank in the Atlantic about 11,500 years ago, there is a probability that some of the lands near the area of disturbance will have arisen at that time. It has been shown in recent years that this is the case in Scandinavia, but it is not yet possible to date similar phenomena elsewhere with the same precision.

The accompanying curve, fig. 2, illustrates the emergence admirably. It has been reproduced after the original by Nansen¹ and was first published in 1928.² So far as the writer is aware the general conclusions

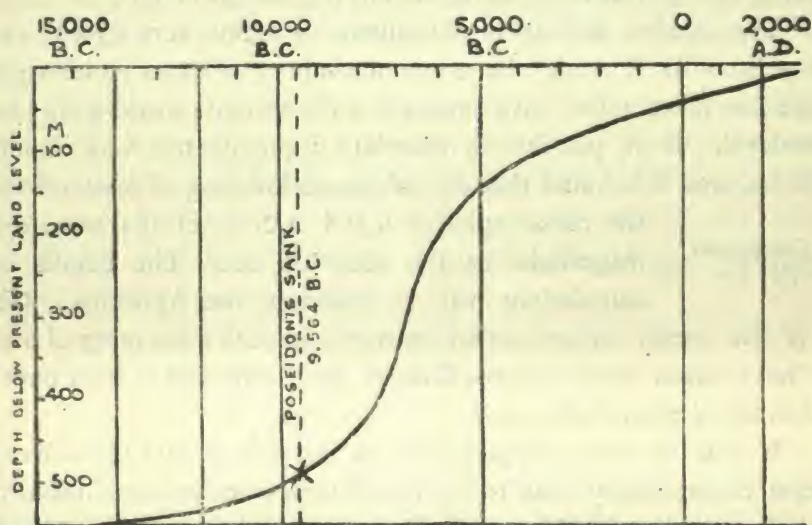


FIG. 2

The rising of Central Scandinavia since 15,000 B.C. (After Nansen).

have not been challenged, though estimates vary as to the actual amount of the uplift. This however does not affect the present argument.

The curve illustrates the rising of the central Scandinavian region since 15,000 B.C. A similar curve with the same implications has been

suppose that Poseidonis sank through some deep-seated weakness in the crust giving it inadequate support. For a time the stable crust surrounding it would resist the tendency for Poseidonis to sink and the crust would then become depressed under the tremendous load. When the strain became too great the crust must have fractured (faulted), the island-continent sunk into the depths of the Atlantic, and the surrounding areas, released from their load, must have sprung upwards.

¹ *The Changing World of the Ice Age*, p. 70.

² F. Nansen, *Avhand, Norske Videnskaps-Akad, Oslo*, KI, I, No. 12, 1928, p. 63.

drawn for Oslo. It will be seen that the land was rising slowly to its present level until shortly after 10,000 B.C., when the land suddenly began to rise much more rapidly. It continued to rise rapidly until about 5,000 B.C. and then continued more slowly to the present day, (at a much earlier period this region was higher than now as shown in fig. 1, a point also recognized by science). The phenomenon implies that Poseidonis sank between 10,000 and 9,000 B.C., which is as close as one can expect from such a curve to the actual date of 9,564 B.C. given by occultists. Though the land ceased to rise rapidly after 5,000 B.C., this does not imply that Poseidonis took this time to reach its present depth beneath the Atlantic. The plastic nature of the earth would cause the effects to persist some time after the original disturbance had ceased, a fact recognized by geologists in the case of the recovery of the earth after the withdrawal of the ice.¹ The occult investigations emphasize the suddenness and overwhelming nature of the catastrophe and the "appalling convulsions" which took place.² It is probable that Poseidonis sank almost immediately to its present position, though this point is not essential to the argument.

Though explanations have been put forward, it is not clear why the land should rise so much faster after 10,000 B.C., unless the sinking of Poseidonis is invoked.

The cause of the Ice Age is still uncertain, and many theories have been advanced. It has also been frequently suggested
Climatic Changes
that land barriers in various parts of the Atlantic may have deflected the Gulf Stream and thus assisted the formation of ice in Europe. As these theories are highly controversial they will not be discussed here,³ but it is worth pointing out that, if a chart showing the Atlantic currents is compared with fig. 1, it is evident that Poseidonis must have deflected most if not all of the Gulf Stream from Europe. It follows that when Poseidonis sank there must have been an improvement in European climate.

The following table, fig. 3, after Daly,⁴ shows that such an improvement of European climate took place. The approximate accuracy of the

¹ *The Changing World of the Ice Age*, p. 65.

² *Man*, p. 312.

³ See *Climate through the Ages*, Chap. III.

⁴ *The Changing World of the Ice Age*, p. 59.

scientific dates can be accepted with confidence.¹ A point which also holds good for fig. 2.

DATE B. C.	CLIMATIC CHANGE
_____?	Climate similar to that of today.
_____5,600_____	Warmer than now.
_____8,300_____	Rapid amelioration of climate from earlier condition.
9,564	SINKING OF POSEIDONIS
_____about 25,000_____	Sub-Arctic to high Arctic.
ICE AGE	

FIG. 3

Table of climatic changes in Europe since the close of the Ice Age, showing that the sinking of Poseidonis was followed by a sudden climatic improvement. (After Daly.)

It will be seen that the climate suddenly became warmer about 1,300 years after the sinking of Poseidonis. Some delay before the Gulf Stream could make its effect noticeable is to be expected. As the specific heat of water is very high, it would take a long time before the enormous quantities of cold water in the north Atlantic would be affected. It should be noted that while the Ice Age ended about 25,000 years ago, the ice took a long time to recede and even as late as 8,300 B.C., the Baltic, a land-locked fresh-water lake, continued to be bound on the north by the edge of

¹ The dates are based on the work in recent years of De Geer and his pupils. In parts of Sweden the clay deposits left by the retreating ice have been laid down in thin layers, one layer each summer as the ice retreated. De Geer counted these layers and thus obtained a positive chronology. His work has been accepted by every geologist who has examined the evidence. See Art. "Glacial Period," *Enc. Brit.*, 1929.





FIG. 6

The bed of the ancient Gobi Sea or Lake. Part of the salt encrusted portion around the present lake Lop Nor, shown in heavy shading in figure 4.

(By kind permission of Sir Aurel Stein, Messrs. Macmillan, and the High Commissioner for India, London.)

the retreating ice sheet.¹ The presence of so much ice must have retarded the influence of the Gulf Stream considerably, but in the absence of necessary data it is difficult to estimate how long this would delay the improvement in climate.

To conclude this section, it has been shown that three independent lines of evidence—the sudden lowering of sea-level, the increased rate of emergence of Scandinavia, and the rapid change of climate—point to a quick change in the earth's economy some 11,000 years ago, and that all are consistent with and can be adequately explained by the sinking of Poseidonis in 9,564 B.C.

Résumé

THE GOBI SEA

One of the most striking characteristics of the map, fig. 1, is that it shows the Gobi and the Tarim basin under water. If it can be proved that there was such a body of water, it would be valuable support for occult researches, particularly those of Annie Besant and C. W. Leadbeater, who in 1913 described in great detail a prehistoric civilization on its southern shores.² According to these investigators this civilization was established about 70,000 years ago and from it various types eventually developed, migrating to form the ancestors of the Hindus, Arabs, Iranians and Europeans of today. It is stated that the inland sea ceased to exist after the sinking of Poseidonis and the civilization came to an end. No doubt increasing aridity caused it to perish.

The Gobi and the Tarim Basin

The available evidence for such a civilization has been brought together in *Corroborations of Occult Archæology*. Here it is proposed to confine ourselves to prove that the Gobi Sea really existed and to show that its ancient shore line, as traced by a geologist in 1929, *exhibits substantially the same contour as that of C. W. Leadbeater's map of 1896*.

It was not suspected that a large part of the Gobi was under water as late as the Glacial period until some striking discoveries were made in and after 1929 by Dr. Erik Norin, the Geologist attached to recent expeditions in Central Asia led by Sven Hedin, the famous Swedish explorer.³

¹ *The Changing World of the Ice Age*, p. 59.

² *Man*, p. 266 et seq.

³ E. L. Gardner, in *The Theosophist*, September 1932, p. 747, was the first to point out that this expedition had confirmed the existence of an inland sea in the Gobi.

Dr. Norin's
Investigations

Fig. 4 is a reproduction of a map published in the *American Geographical Review* of 1932, (pp. 591-598). It shows the results to date of Dr. Norin's investigations. As Sven Hedin says, Dr. Norin has discovered that "in late Glacial times the whole of the Tarim basin was filled by an



FIG. 4

Map published in 1932 by Dr. Norin, Geologist to Sven Hedin's expedition to Central Asia, showing the deposits left by the prehistoric Gobi lake as discovered by him in and after 1929.

(Courtesy of the "Geographical Review" published by the American Geographical Society of New York).



FIG. 5

The Gobi in prehistoric times according to clairvoyant research. Drawn to the same scale as the original map of 1896. See fig. 1. The tongue of water on the left should be carefully compared with fig. 4 above, allowing for the difference of scale. The arrows indicate corresponding degrees of latitude and longitude.

enormous lake or inland sea, a Mediterranean Sea, of whose great volume of water the historical lake of Lop Nor is the last disappearing survival."¹ (Fig. 6).

Dr. Norin's map illustrates the maximum extent of this body of water as shown by the raised beaches left as it dried. Fig. 5 shows the Gobi area according to the Scott-Elliot map of 1896 to the original scale.

Allowing for difference of scale, the resemblance is remarkable and much too close to be a coincidence. It will be noted that the western portion, more than half of the sea as depicted by occultists, has not been discovered by Dr. Norin. It should be realized that the area he has already investigated is equal to that of England, and his work is a remarkable achievement for only a few seasons' activity. One awaits with the greatest interest any further discoveries. It may be mentioned here that when Scott-Elliot's map was published in 1896, the information available on the geology of the Tarim was of the scantiest. Even the geography of this region was imperfectly known until the expeditions of Sir Aurel Stein, Sven Hedin and others in this century were accomplished.²

Sven Hedin was engaged in 1937 on a commission given him by the Chinese Government to survey the best route for a road from China to Kashgar. This will pass through the Tarim basin and will eventually make this area easily accessible to the archaeologist. We can hope for further discoveries in this region before many years elapse. In the meantime it may be noted that reference to a good relief map will show that even today there is a depression in Central Asia corresponding approximately to fig. 5.

It will be noticed that allowing for scale the corroborated portion of the occult map is a little larger than the scientific one. This slight inaccuracy is, to say the least, excusable when it is realized that the original maps were seen psychically and then had to be reproduced from memory. The investigators were careful to state that they did not claim that this and other maps published with it were accurate to a degree of latitude and longitude.³

¹ *Across the Gobi Desert*, 1931, p. 376.

² C. P. Berkey and F. K. Morris, *The Geology of Mongolia*, 1931, pp. 14-18 for an account of early expeditions. The appendix to this work contains a full bibliography.

³ *The Lost Lemuria*, p. 13.

The darker patch to the right of Norin's map does not represent the original lake, but a later stage when it was fast disappearing. There was a long period during which the Tarim lake was fed with water from glaciers a hundred miles or more away in the mountain valleys along the edge of the Tarim basin. During this time the lake was *fresh*. Later, possibly in post-Glacial times according to Norin, the bed of the lake was tilted so that the waters came to occupy the position shown by the dark patch already mentioned.

In this new position the lake began to dry up and become salty, and eventually in historical times it nearly disappeared.

The tilting of the lake-bed through some geological disturbance, and its drying up, possibly in post-Glacial time, fits in admirably with the occult statements that after the catastrophe of 9,564 B.C., which was attended by great earthquakes, the Gobi became dry land.¹

An important point to note is that Norin's work indicates that the water was originally fresh. The occult investigators called it the "Gobi Sea", evidently thinking it to be salt. Doubtless they were led to believe this by the Scott-Elliot maps of earlier periods (not shown here), which show the Gobi connected by one or more narrow channels with the Arctic Sea. Even during these earlier times the Gobi may have been fresh or brackish. The narrowness of the channels combined with the many rivers which must have emptied themselves into the Gobi from much of Central Asia, would suffice to keep this land-locked body of water fresh or nearly so, especially as it was stated to be shallow.² Hence it is quite possible that by the period traced by Norin the water was fresh.

Changes of this character are not unknown to science. It is well known to geologists that at the end of the Ice Age the Baltic Sea became land-locked and went through a fresh-water phase.³ Even today owing to the drainage of rivers into the Baltic, it is markedly less salty in certain parts than the open sea.

Another important point is that both a recent American expedition⁴ and that of Sven Hedin's report that during the Ice Age the Tarim basin

¹ *Man*, p. 412.

² *Ibid.*, p. 247.

³ *The Changing World of the Ice Age*, p. 58 *et seq.*

⁴ *The Geology of Mongolia* (1931), p. 383, and fig. 157.

and the Gobi proper were not covered by an ice cap, though glaciers formed in the great mountain ranges surrounding. It follows that even 70,000 years ago (when a great civilization was, according to occultists, established on its shores) the climate would readily permit of man living there.

As Sir Francis Younghusband remarked when reviewing Sven Hedin's book in *The Observer*, "What a lovely sea it must have been to sail upon with snowy mountains on three sides of more than Alpine altitude".

THE GREAT SUMERO-IRANIAN PREHISTORIC CIVILIZATION

We have seen that the occult investigators, Annie Besant and C. W. Leadbeater, have stated that various peoples, sometimes known as "Caucasians", originated on the shores of the Gobi Sea; the various types which evolved there, conveniently called sub-races by the investigators, eventually migrated to different parts of the Old World. An outline of these prehistoric migration is given in *Man: Whence, How and Whither*. Among these the history of the third sub-race, the Iranians, deserves particular attention.

The investigators state that it was about 30,000 B.C. that the Iranians set out from their original home in Central Asia. In a few centuries they dominated the whole of Western Asia, including Mesopotamia from the Mediterranean to the Pamirs and from the Persian Gulf to the Sea of Aral. See fig. 7. The people incorporated in their nation the scattered population of Arab stock which existed in the country when they entered it. They were therefore Iranian (third sub-race) with some admixture of Arab (second sub-race).

During the 28,000 years of their Empire there were many fluctuations; most of the time Persia and Mesopotamia were under separate rulers and sometimes the two countries were split up into smaller states. Once at least they conquered Syria, and twice embroiled themselves with Egypt against which they could do little. At one time they made temporary settlements in several countries bordering the Mediterranean, including Asia Minor. They kept up a high level of civilization and many relics of their mighty architecture lie buried under desert sands. They were great traders, merchants and manufacturers.

The present inhabitants of Persia have still much of their blood in them though largely commingled with their Arab conquerors. The



FIG. 7

Map of the prehistoric Sumero-Iranian Civilization (c. 30,000-2,200 B.C.) with approximate boundaries, as described by Annie Besant and C. W. Leadbeater through clairvoyant research.

Kurds, Afghans and Baluchis are also mainly descended from them, though with various admixtures.

With certain changes this great Empire lasted until about 2,200 B.C.¹

Not much information was given by the occult investigators as to the customs and artifacts of this civilization, but an army in 30,000 B.C. was observed to fight in phalanx formation with bows and arrows and with long and short spears.

It is not an exaggeration to state that until recently there was practically no scientific evidence in support of the above statements. The most that could be said was that about 2,200 B.C. the Sumerians, as yet a people of unknown origin,

¹ *Man*, p. 292 and Chap. XVIII. Further details will be in *The Lives of Alcyone*, V, VI, IX, X, XI.

in Mesopotamia were overcome by the Elamites¹ (still of unknown origin) and that the Sumerians might therefore be the last surviving relics of the third sub-race Empire.

Even in 1916 Professor Breasted had to confess that "we are unable to connect the Sumerians with any of the great racial groups known to us".²

They were only known by inscriptions, and skulls were not yet available.

The excavations of recent years at Ur and elsewhere in Mesopotamia and Persia enable us to support nearly every one of the occult statements above by evidence of a very striking character.

From skeletons found at Ur during the excavations Sir Arthur Keith reports that

The Mesopotamian peoples both past and present represent a transition between Iranian and Semitic types,³ but they have retained more of the Iranian than the Semite . . . The southern Mesopotamians at the beginning of the fourth millenium B.C. had big, long and narrow heads, their affinities were with the peoples of the Caucasian or European type—they were akin to the pre-dynastic people of Egypt described by Dr. Foquet,⁴ but different from all other pre-dynastic and dynastic Egyptians . . . One can still trace the ancient Sumerian face eastwards among the inhabitants of Afghanistan and Baluchistan until the valley of the Indus is reached—some 1,500 miles distant from Mesopotamia.⁵

Note that this distribution agrees with the occult statements. See fig. 7.

There is also good evidence to show that long before the earliest Sumerian dynasties, people of the Arab type were present,⁶ thus supporting the occult statement that Mesopotamia was inhabited by Arab peoples before the Iranians arrived.

These conclusions are based on excavations made between 1919 and 1925 by various museums at Kish and at Ur. The excavations have fully demonstrated the remarkable architectural skill of these Sumerians or third sub-race people, and have brought to light jewelry, utensils and weapons

¹ J. H. Breasted, *Ancient Times*, 1916, p. 128. The exact date is controversial.

² *Ibid.*, p. 107.

³ From the context it is clear that by Semite the Arab type is meant.

⁴ *Recherches sur les Origines de l'Egypte*, 11, p. 269.

⁵ *Ur Excavations: Al-Ubaid*, 1927, pp. 216, 240.

⁶ *Sumeria*, p. 15.

of gold, and other materials that would do full credit to a modern craftsman.¹

They had a highly developed system of laws and of book-keeping. The fact that they were great traders, merchants and manufacturers, their elaborate system of national and foreign trade² and the extent of their influence, is amply confirmed by the discovery of Sumerian manufactures in ancient Egypt, and at Mohenjo-daro near the borders of Baluchistan.³ They also established a settlement at Ganes in Cappadocia, Asia Minor.⁴ Indeed Sumerian metal types have been found in south Persia, Troy, Central Europe and Zagros on the Ægean.⁵ Note again that this distribution agrees with the occult data incorporated in fig. 7.

It is of interest that, just as the occultists describe, the Sumerians fought in phalanxes and included bows and arrows and spears⁶ among their weapons.

Commenting on the discoveries at Mohenjo-daro, Woolley says :

Recent excavations in the Indus Valley have brought to light extensive remains of a very early civilization, remarkably developed, which has a good deal in common with that of Sumer: particularly striking are rectangular stamp seals found in the two countries which are identical in form, in the subjects and style of their engraving and in the inscriptions which they bear, while there are similarities hardly less marked in terra-cotta figures in the methods of building-construction and in ground-plans. To say that these resemblances prove identity of race or even political unity would be to exaggerate the weight of evidence; to account for them by mere trade connection would be, in my opinion, to underrate it no less rashly: it is safest for the time being to regard the two civilizations as offshoots from a common source which presumably lies somewhere between the Indus and the Euphrates.⁷

¹ Though excavations were first undertaken by Taylor in 1854, a series of examination of the sites were not made till after the World War. *Enc. Brit.*, Art. *Ur*. (1929). See C. Leonard Woolley's *Sumeria* and *Ur of the Chaldeas*, and Prof. Langdon's *Excavations at Kish*.

² *Sumeria*, p. 115 et seq.

³ See *Illustrated London News*, 20, 27 September and 4 October 1924; 27 February and March 1926.

⁴ *Sumeria*, p. 49.

⁵ *New Light from the Most Ancient East*, 1933, p. 184.

⁶ *Ibid.*, pp. 140, 182.

⁷ The first (preliminary) account of the excavations at Mohenjo-daro appeared in *Report Arch. Survey India*, 1923-4, pp. 52-5. *Sumeria*, pp. 8, 9.

Professor Langdon also writes :

I incline to the belief that a great prehistoric civilization spread from Central Asia to the plateau of Iran and to Syria and Egypt long before 11,000 B.C. and that the Sumerian people, who are a later branch of this Central Asian people, entered Mesopotamia before 5,000 B.C.¹

An opinion, which it is hardly necessary to point out, is in striking agreement with the occult observations. More recent work has brought ample support for the existence of this prehistoric Iranian civilization.

During the last ten years, Sir Aurel Stein has led no less than three expeditions into Baluchistan and the eastern borders of this region. He has reported his discoveries in his epoch-making Huxley Lecture to the London Anthropological Congress of 1934.² Everywhere he found dried up and almost deserted lands, but also unmistakable evidence that in prehistoric times these lands had been the homes of long-established civilization. Mounds, often one hundred feet or more high and a mile in circumference, marked the sites of prehistoric towns. In most of these mounds he found pottery of a similar kind, indicating a uniform culture. The presence of many disused dams demonstrated the existence of a widespread irrigation system just as described by the occult investigators. The evidence indicated that this civilization ended about 2,000 B.C. (the occult investigators state 2,200 B.C.), but its beginnings are lost in the mists of antiquity.

At the same Congress, Mr. M. E. L. Mallowan read a paper on the antiquity of the very ancient pottery that has been found in Syria, Iraq, Iran and Baluchistan. (Compare with fig. 7.) He concluded that the prehistoric potters used "a common fund of design, which persisted for a great span of time over widely separated areas" as early as the fourth millenium B.C. Commenting on the pottery and other finds made by Sir Aurel Stein, Professor Gordon Childe says that this survey of Baluchistan does in fact help to prove that the region must once have formed part of a cultural continuum extending from the Tigris to the Indus.³

It is clear that the later phases, if not the earlier, of the Iranian civilization described by the occult investigators; have been unearthed by these post-War discoveries.

¹ *Cambridge Ancient History*, vol 1, p. 362, (1923).

² *The Indo-Iranian Borderlands*, (1934).

³ *New Light from the Most Ancient East*, p. 277.

The Antiquity of
the Sumerians

It remains to consider the antiquity of the Sumerians. Certain King-lists have been recovered giving the names and length of the reign of Sumerian Kings. From this and other evidence, the Third Dynasty of Kish began about 3,000 B.C.¹ On the other hand the remains of still earlier dynasties are plentiful, but these cannot be dated accurately because the King-lists ascribe obviously fabulous dates to these earlier rulers, giving each reign hundreds or thousands of years. They are of value, however, as indicating that the early Sumerians themselves believed that their civilization was already of high antiquity.

Under these earlier deposits of unknown antiquity, but certainly earlier than 3,000 B.C., Woolley found 8 feet of water-laid clay, thus proving the existence of "the flood" mentioned near the beginning of the King-lists. Beneath the clay further relics were found, supporting the statement of the King-lists that there were Kings before "the flood". This flood may have been caused by a protracted overflow of the Euphrates. It is tempting to suppose, as Miss E. W. Preston suggests,² that the overflow was caused by the "appalling convulsions" which attended the last sinking of Poseidonis in 9,564 B.C.

This may well be true, but since the latest discoveries indicate that there was more than one flood in Mesopotamia, each apparently differing in extent,³ it seems best to leave the matter until a later date when more information is available.

If we adopt the very conservative date of 3,000 B.C. for the flood deposits discovered by Woolley, though he himself believes them to be more than 6,000 B.C., the fact that no less than 60 feet of man-made deposits have been excavated under those left by the flood, suggests that the earliest Sumerian deposits are of very high antiquity.

The thickness of a deposit is notoriously unreliable for estimates of age, but a 60-feet deposit must be of considerable age. It seems justifiable, therefore, even on conservative grounds to hold that the minimum date for the earliest Sumerian remains so far excavated is 5,000 B.C., and that they may be much older.

It only remains to show that this civilization existed as far back as 30,000 B.C. and that in its earlier stages both Star and Fire worship were

¹ *Sumeria*, p. 24, *et seq.*

² *E. & C.*, p. 121.

³ *New Light from the Most Ancient East*, p. 147.

practised in Iran as described in *Man: Whence How and Whither* (Chap. XVIII). Since so much has been verified in the last twenty five years, who knows but that the next twenty five years will verify this point also and thus give a complete verification of this phase of occult investigations.

SUMMARY

Occult Statements, 1913

Great prehistoric Iranian and Mesopotamian civilization of Iranian (Caucasian) peoples with Arab admixture.

Approximate extent as shown on fig. 7.

Great traders and merchants.

Fought in phalanxes.

Mighty architecture. Many irrigation works in Iran.

Began 30,000 B.C., ended 2,200 B.C.

Scientific Discoveries, after 1918

Great Mesopotamian civilization, with considerable evidence that it extended across Iran, of Iranian (Caucasian) peoples with Arab admixture.

Approximate extent as shown on fig. 7.

Great traders and merchants.

Fought in phalanxes.

Mighty architecture. Many prehistoric dams in eastern Iran.

Unknown beginnings, ended c. 2,000 B.C.

THE PREHISTORIC ARAB CIVILIZATION IN EAST AFRICA

Occult Statements

The Arabic or second Aryan sub-race, which is best represented today by the Bedawin of northern Arabia, left Central Asia about 40,000 B.C. and colonized Arabia, Iran and Chaldea.¹ By 38,000 B.C. they had pushed their way down the east coast of Africa to the Cape of Good Hope itself, and had founded a kingdom which included all Mataberland and Transvaal and the Lorenzo Marques district.² Eventually, except for a strip on the west

¹ *Man*, 1913, p. 279 et seq.

² *Ibid.*, p. 290.

coast, Arabia and Egypt practically divided between them the continent of Africa.¹ See fig. 8.



FIG. 8.

Map showing approximate distribution of the East African Arab civilization, c. 38,000-2,000 B.C., described by the clairvoyant investigations of Annie Besant and C. W. Leadbeater. Sites of corroborative discoveries are also included.

In Iran and Chaldea, however, the people were rather unsettled and turbulent, so much so that by 30,000 B.C. these districts were almost

¹ *The Lives of Alcyone*, 1924, p. 70.

depopulated by constant warfare. There was thus little opposition when the Iranian peoples came forth in their turn from Central Asia to take possession, as described in the previous section, but in East Africa the people were more settled and they were able to maintain their civilization for many thousands of years. It was observed that much later they were responsible for the Hyksos invasion of Egypt. Since both occult and scientific research indicate the presence of the Hyksos in Egypt about 2,000 B.C.,¹ the East African civilization must have persisted until that date and it may have lasted later, though just how much later the investigators have not stated. It will be seen that for most of the time it was contemporary with the Sumero-Iranian civilization.

The people were tall and handsome and almost white in colour. Some intermarried with Negroes but on the whole they did not mix. They used swords and spears, occasionally javelins and bows and arrows. They were great hunters and kept large numbers of cattle. Some were agriculturists and others merchants. In South Africa the country was not so barren as now, it was park-like and there were vast herds of wild beasts. There were some large cities and imposing temples. No mortar was used but large well-cut stones were laid upon one another. The temples were oriented and the religion was a form of sun-worship.

Formerly this sub-race had constructed great terraces along the mountain valley which was their original home in Central Asia.² When they reached Arabia they laid out a valley in imitation of the one at home.³ With the establishment of the East African Empire the people "introduced into their new country all the arts of their civilization much as had been done in Arabia before".⁴ From this it is clear that the occult investigators mean to imply that terracing was introduced to the mountainous parts of East Africa.

Scientific Corroborations

There is considerable evidence now available to show that there has been a civilization of advanced type in prehistoric times throughout eastern

¹ *Man*, p. 290; *Ancient Egypt*, 1929, p. 41.

² *The Theosophist*, Vol. XXXIII (1911-12), p. 263 et seq; *The Lives of Alcyone*, pp. 47, 55.

³ *The Lives of Alcyone*, pp. 61, 71.

⁴ *Ibid.*, p. 70.

and southern Africa. Thus Dr. L. S. B. Leakey made the surprising discovery in 1928 of fragments of pottery *underneath* certain deposits of palæolithic type¹ in Gamble's cave, near Lake Elmenteita, East Africa. These deposits contained implements similar to certain cultures found in Europe. If they were manufactured at approximately the same time as those of similar type in Europe, the pottery must have had an antiquity of many thousands of years; on a conservative estimate 20,000 years or more.²

In *Man* (the anthropological journal of that name) for November 1932, Captain G. E. H. Wilson discusses the evidence for the existence of a forgotten civilization in East Africa, to which he first drew attention in 1928. The existence of ancient works, *terracing on a large scale*, graded roads and irrigation works, canals and drainage, is now established in Tanganyika, Abyssinia, Uganda, Kenya and Northern Rhodesia. The roads clearly, not elephant tracks, point to a high state of civilization. The points at present located suggest a system of communication running north and south on the eastern side of the great lakes, pointing to outlets by way of the Nile to the north, and by Rhapta in the south, with possibly an intermediate route via Mombasa, the origin of which, in his opinion, may be very ancient. See fig. 8.

In some districts there are river diversions which may be artificial. There are legends of an alien race dominating the local peoples in both North and South Tanganyika. They are referred to as "tall", "bearded", "strangers", or "enemies". It should be noted that while the Arabs are bearded, Negroes tend to be beardless. Captain Wilson suggests that this ancient civilization originated from the north, that it may be of very high antiquity, and that it existed very probably before 1,500 B.C. This date, however, is but a tentative one.

In South Africa striking evidence for alien intrusion is provided by Bushman rock-paintings. Though many of these paintings have been illustrated in the past, their full archæological significance was not appreciated until Brother Otto, a Trappist monk of Natal who had himself carefully copied many of the paintings, drew the attention of Professor Raymond A. Dart, the well-known South African authority, to some of their peculiarities.

Bushman Rock-
Paintings

¹ In Europe pottery was not known until the much later Neolithic age.

² Sir Arthur Keith, *New Discoveries Relating to the Antiquity of Man*, Chap. X.

In 1925 Professor Dart published his conclusions from his studies of the Bushman drawings.¹ He pointed out that while some of the pictures are obviously of the Bushmen themselves, others show intruders usually bearded, armed with bows and arrows, swords, javelins and other weapons, whereas the Bushman in these old pictures is generally armed only with a stone or stick or is unarmed. He thinks it probable that the Bushman learned the use of the bow from such visitors.

The intruders are often shown taller than the Bushmen. Their faces are usually shown in white pigment, whereas Bushmen generally represent themselves and other natives with black or scarlet pigment. A striking feature of some of the drawings is the different styles of headgear worn by the foreigners. The headdresses variously suggest eastern Mediterranean, Egyptian, Babylonian and even Chinese influences. There may also be an Arabic influence but unfortunately we do not yet know anything of the styles worn in ancient Arabia. For all we know Babylon may have derived its fashions in hats from Arabia.

How far the drawings represent occasional visitors and how far permanent settlers is a problem for further investigation, so also is the approximate dates of the drawings, but additional evidence seems to make it clear that there were widespread Arab settlements in early days in South Africa. Professor Dart has collected hundreds of place-names with Arab roots of which many, as he says, are undoubtedly pre-Koranic and hence may well go back at least two thousand years. A few of the roots, it is interesting to note, appear to be of Indian origin. Professor Dart goes on to say :

That Rhodesia was brought into contact directly with Arabian and Indian products is shown by the fact that vines, lemons, figs and cotton, though not indigenous to South-east Africa, are found on the terraced hills of Inyanga in Rhodesia.

Rhodesia is pervaded by extensive monumental remains in the form of monoliths, stone circles, and stone buildings together with vast areas of terraced cultivation. In many instances the buildings reveal a nicety of architecture and a regard for sanitation such as are not characteristic of Southern African natives.

Some of these stone buildings are made without mortar. While many of them have long been known to travellers, their date is still controversial. Some authorities would say they are all mediæval, but others maintain that some are much earlier than this and go back to prehistoric times.

Buildings without
Mortar

¹ *Nature*, 21 March 1925, p. 426.

Some further discoveries enabled Professor Dart to write some years later:

The existence of a Bronze Age in South Africa has been established by incontrovertible evidence. Such a phase has not hitherto been recognized by antiquarians.¹

He is of the opinion that this African Bronze Age probably syn-
 The Bronze Age chronized with those of Egypt and Sumeria, in which case it must go back to at least 3,000 B.C. which, as we have indicated in the Introduction, is an early date for present-day archæological research.

It has been discovered that in ancient times large scale mining operations took place covering the enormous area from Katanga and Broken Hill to Pretoria, and from Kalahari to the eastern coast, the whole forming a single cultural unit. See fig. 8.

The great age of at least one of the mines was demonstrated by the existence of a stalagmite 15 feet high and 8 feet thick in its narrowest part, in such a position as to render practically certain its formation since the occupation by the miners:

At Blauwbank no fewer than thirty furnaces used by the ancient bronze-makers of Africa have been discovered. As Professor Dart points out:

The Bantu people when first discovered did not belong to a "Bronze" but to an "Iron" culture, and there is no evidence to show that they evolved through a Bronze phase to an Iron phase. We are forced to conclude that the highly intricate metallurgical processes of bronze-making, demonstrated by the deposits at Blauwbank, betray the actual presence there at a remote age of skilled and intelligent craftsmen from a superior cultural area. Seeing that the deposits are half-way across the continent, some estimate may be arrived at concerning the lengthy period of South Africa's exploitation by that superior race utilizing bronze.

To the physical anthropologist who has lived in South Africa and has had the opportunity of seeing practically every tribe in the south-eastern end of the continent, there is concrete evidence in the thousands of negroid inhabitants with straight, aquiline and hooked noses, elevated nasal bridges, reduced lip fullness, and lack of prognathism, to demonstrate beyond cavil the flood of Semitic and other Caucasian blood which flows in the veins of the Bantu people.

Though it is not yet quite certain that the two vast areas dealt with by Captain Wilson and Professor Dart formed one cultural unit

¹ *Nature*, 30 March 1929, p. 495.

under Arab influence in prehistoric times, it is evident that, so far, these discoveries are a striking support for the occult observations; though they suggest the further possibility that during these thousands of years there have been intrusions of Indian and other peoples subsidiary to the Arab civilization, and either contemporary with it or later.

SUMMARY

Occult Statements

Arab civilization in East and South Africa characterized by terracing, 38,000- c.2,000 B.C.

Tall people, men presumably bearded since they were Arabs.

Armed with bows and arrows, javelins and swords.

Stone buildings without mortar.

Intermarried to some extent with Negroes.

Scientific Corroborations

Extensive roads and terracing in East Africa. Bronze Age in South Africa. Dates unknown but probably ancient. Pre-Koranic Arab place-names. (Some Indian). Terraces in Rhodesia with non-indigenous plants belonging to Arabia and India.

Bushman drawings of tall white, bearded strangers, in South Africa. Traditions of tall bearded strangers in East Africa.

Bushman drawings of foreigners with bows and arrows, swords and javelins. Headgear suggests eastern Mediterranean, Babylonian and possible Arabian influences.

Stone buildings without mortar, date uncertain.

Semitic blood in many South African natives.

CONCLUSIONS

Clairvoyance is a fact. As Professor Charles Richet has pointed out in his classic work, *Thirty Years of Psychological Research*, it has far better attestation than the majority of alleged historical facts, for it has been demonstrated many times experimentally. Now it begins to appear that clairvoyance has possibilities as a means for research.

It would not be fair to reject this claim merely because of its remarkable and even startling nature. There are many modern facts and theories which would have appeared as startling to the scientists of the nineties as clairvoyant research appears to us. One has only to think of television, the transmutation of matter, and curved space. It should not be forgotten that there are eminent authorities still living who were once convinced that Hertzian waves could not be sent across the Atlantic, that men would never fly, and that many another almost commonplace miracle of today was impossible. Truly the will not to believe can be as strong as the will to believe!

Modern science has amply demonstrated that not only are there more things in heaven and earth, but that there are queerer things, than we have ever dreamed of in our philosophies. A few more miracles in a world already shown to contain miracles on every side should not excite undue scepticism.

It is true that very few have developed clairvoyant powers today sufficiently to be used for research, but the investigators themselves have assured us that it can be done, though at the cost of a great deal of hard work. Much the same condition applies to scientific study and research. In theory, anyone can find out for oneself the precise means by which astronomers calculate the moon's orbit. In practice only

Training is
necessary!

a very few have the ability, time and inclination to undergo the necessary training in mathematical astronomy. Indeed, one can go further than this and maintain that all the really fundamental scientific advances have been made by less than a hundred individuals. All honour to these pioneers, humanity owes them much! All honour, too, to those in the second rank who, if they have not actually erected the building, have helped to embellish it.

The work of these comparatively few individuals has transformed human society, in the course of a few centuries, because it dealt with fundamentals in Nature. It is obvious that if extended powers of clairvoyance available for research are developed by even a few students, this too in the course of time will have a profound effect on human society and will open up stupendous possibilities. No doubt, as clairvoyant research is justified of her children, an increasing number of suitable students will be prepared to undergo the arduous training required.

Clearly, an indispensable qualification is a high order of altruism, if

High Order
of Altruism,
Necessary!

¹ See p. 8, this Part—Ed.

the development of these powers is to prove a blessing and not a curse to humanity.

One may venture to suggest that, in future investigations, attention should be paid to certain points of value to the archæologist. While ample descriptions are given of the more important prehistoric civilizations from a literary point of view, it would be of value to give attention to the form and decoration of the more common metal types and objects of pottery. Metal and pottery will often survive for the archæologist to discover, long after other things have disappeared. Attempts should also be made to locate more precisely the principal cities of a country, as these are the most likely sites to be uncovered. This would eventually permit a more complete assessment to be made of the accuracy of clairvoyant observations.

Hints to future
Investigators

It should be remembered that the investigators did not claim any special knowledge of archæology, their interest was primarily in the direction of studying the history of mankind in broad outline and to follow the relationships of a group of people through a series of incarnations.

This brings us to a very important characteristic of the investigations. The investigators frequently describe themselves as moving in the scenes of the past. In this case it is not so much clairvoyance in the ordinary sense as actual memory of past lives which they are using. If archæology can confirm the accuracy of their descriptions it will obviously furnish strong evidence for the truth of reincarnation.

Memory of Past
Lives

The best proof of reincarnation for the individual is memory of his own lives, but while that is, proof for him it does not always satisfy others. Corroborations of occult archæology will supply a proof which every one can appreciate. Accepted by millions in the East and long known to its seers, acceptance of the doctrine of reincarnation in the West would form a new bond between East and West, the full effects of which would be incalculable. It should at least make more racial, cultural and religious contacts between India and Britain possible; the Indo-British Commonwealth would not only be a political union but a spiritual one, and one of Dr. Besant's most magnificent dreams would be a reality.

It may not be out of place to consider briefly some of the philosophical implications of the presence of clairvoyant powers in man, powers which recent work strongly suggests are latent in every one.¹

Some scientific thinkers of today are being forced by the logic of their discoveries to consider the world-process, in some sense, as a Mind at work. Such a view has had the support of a distinguished line of western philosophers from Plato to the modern Idealists. It forms the basis of much of Indian philosophy and is one of the principal teachings of Theosophy.

On this view the universe is at once an expression and an incarnation of the Universal Mind, while man is seen to be not only of the same substance as the universe in the physical sense, but also in the metaphysical sense. He is an expression of that Mind, and as he evolves he expresses more and more of its transcendental attributes within the limitations of time and space. Clairvoyance is a reflection of omniscience, it is the expression in man, under the limitations of time and space, of the transcendental omniscience of Universal Mind. All powers of consciousness are powers of Universal Mind under greater or lesser limitation; hence as man grows he inevitably expresses more and more of these powers, including clairvoyance, until every conceivable attribute of consciousness is his. Truly, man's future is a thing the splendour and glory of which knows no limit.

The great significance of the extraordinary achievements of modern science is apt to be overlooked because they have become so familiar as to appear almost commonplace. Physically, man is a minute portion of an insignificant sphere of matter, yet this organized atom we call man can analyse the stars and plumb the immensities of space. Surely the consciousness of man must be of the same essence as that from which the universe has sprung.

Man can know the universe because it is one aspect of the greater Self of which he forms a part. Clairvoyance is but another indication of this great truth.

¹ J. B. Rhine, *Extra Sensory Perception*, 1934.

APPENDIX

THE LOWERING OF SEA-LEVEL THROUGH THE CATASTROPHE
OF 9,564 B.C.

Though the map, fig. 1, shows conditions 75,000 years ago, Scott-Elliot believed it to represent conditions approximately to 9,564 B.C.¹ For the following rough estimate it will be sufficient, therefore, to take it as representing the world just before the catastrophe. In order to ensure greater accuracy, the original large map published by Scott-Elliot in *The Story of Atlantis*, was used.

Using this map it is estimated that Poseidonis had an area of about 1,500,000 sq. km. Reference to a physical atlas shows that the average depth of water over the site of Poseidonis is about 2.5 km. Hence Poseidonis was replaced by a volume of water of about 3,750,000 cu. km. The large unnamed island in the south Atlantic is also now at a depth of about 2.5 km. Its estimated area is 1,240,000 sq. km. Hence it was replaced by a volume of water of about 3,100,000 cu. km. Adding this to the volume for Poseidonis itself we have:

Total volume of water ... 6,850,000 cu. km. *A*

It has been estimated² that if 42,000,000 cu. km. of water were to be extracted from the oceans, this would lower sea-level by 105 metres. From this and *A* it follows by simple proportion that the lowering of sea-level through the catastrophe was about 16 metres.

This estimate is on the low side because part of the ocean-bed surrounding these areas will have sunk also. It is difficult to estimate the effect of this, but probably the true value is:

Lowering of sea-level through sinking of

Poseidonis, etc. ... 16 to 20 metres. *B*

The remainder of the Atlantic bed must have been little disturbed as the continental margins, with the exception of a small portion of South America, were practically unchanged.

After the Ice Age was over the polar ice caps diminished in size, thus returning water to the ocean and gradually raising sea-level. It follows that the 6-metre drop, at *present* sea-level, noted by Daly to have occurred in post-Glacial time, and which it is suggested was due to the sinking of Poseidonis, has been partly obscured by the oceans rising again as the ice melted. It has

¹ *The Story of Atlantis*, p. 19.

² *The Changing World of the Ice Age*, p. 48.

been estimated that from about 8,300 years ago (the beginning of the Bothnian sub-stage) to the present time, sufficient ice has melted to raise the sea-level about 15 metres.¹ This estimate is the nearest available one to the actual date of the catastrophe. It is sufficient for the purpose of this necessarily crude calculation. Adding this to the observed drop of 6 metres² we have :

Estimated lowering of sea-level from	
geological data	... 21 metres. C

It will be seen that *B* and *C* are of the same order of magnitude.

We shall now proceed to justify, omitting consideration of the other areas shown on the map which sank below the water or rose above it. It should be realized that Poseidonis and the south Atlantic island are now at the bottom of the Atlantic at an average depth of no less than 2.5 km. It follows that the effects due to the sinking of these masses will be much greater than those due to emergence from shallow water or submergence to a small depth. It will also be realized that if one area went down while another came up, they will tend to neutralize each other so far as their effect on sea-level is concerned.

The area in northern Canada which sank would have had very little effect, as water depths there today are small. We do not know how deeply the area in northern Russia was submerged, but it also must have been small. There is no geological evidence for this area or any other along continental margins having emerged from great depths in geologically recent times. Furthermore, as we have seen, the emergence in north Russia will have counterbalanced the submergence in north Canada.

The Sahara Sea raises a different problem. Its area is about the same as the combined areas of Poseidonis and the south Atlantic island, but on the other hand there is good evidence that it was quite shallow. If the Sahara today were submerged about 600 feet it would be flooded by a very shallow sea of about the shape shown in fig. 1. We conclude that the drying up of the Sahara will have raised sea-level to small extent. It will have been countered by the sinking of the portion of South America indicated on the map. This area though of moderate size is now at a considerable average depth. The only other point which requires discussion is the Gobi Sea. The map shows it 75,000 years ago but it diminished in size and eventually dried up at the time of the catastrophe, hence it has no effect on our calculations.³

¹ *The Changing World of the Ice Age*, pp. 57-8.

² *Ibid.*, p. 157 et seq.

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¹ See diagrams 10 to 12, in *Geology*, this part—Ed.

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Lewis Spence *The Problem of Atlantis*, 1924.

Reviews much of the evidence for Atlantis.

A NOTE ON ARCHÆOLOGY

THE PRESENT POSITION

BY T. BALAKRISHNAN NAYAR

BETWEEN 1938 when this chapter was written and now considerable volume of archæological evidence has been accumulated, throwing light on the many dark spots in the history of man's past despite the archæologically speaking lean years of World War II, during which human energy was concentrated mostly on the prosecution of a deadly struggle between nations and not on the pursuit of knowledge for its own sake. The longest strides have been taken in the field of prehistoric archæology where with the application of the science of geochronology it has been possible to measure in terms of years the sequence of human cultures. By means of tree-ring and varve-clay analysis and by the solar radiation method we can now draw up time-scales as Dr. Zeuner has demonstrated for the entire period of man's existence on earth. The method of tree-ring analysis taken by itself has provided us with a reliable chronology extending over the last 3,000 years in the historic and prehistoric phases of North America. In Europe and in Asia its application has so far been entirely within the historical periods. Without it no reliable calendar could have been drawn up for the dwelling sites and cultural phases of the South-Western United States, though what has been accomplished covers only the last 1,500 years. In spite of the fact that they have not been yet correlated with prehistoric phases in their geographical milieu, tree-ring countings in Arizona have been found to extend backwards to 1,900 years and in California to 3,000 years and a little more. Varve-clay analysis, or the method of counting the varved clays deposited in melt-water basins by the retreating ice of the glaciers, has given us a complete time-scale for the period from the end of the Palæolithic to the

Iron Age in the Baltic region. The third method gives us a time-scale extending over a million years and covering the whole of the Palæolithic or the Ice Age.

Today we know that the Capso-Tardenoisian, which is one phase of the upper Palæolithic industry in Egypt, reaches back to 18,000 B. C. The most important discovery in the field of prehistory during the period under review has no doubt been that of some kind of 'Abbevillian' or 'Clacto-Abbevillian' industry in the Sicilian beach in Morocco and Portugal.

Since the beach in question is of pre-Pleistocene Age we have to conclude that man as a tool-maker already existed in the Pliocene Age. Pre-Crag flake implements from East Anglia are also probably of Pre-Pleistocene Age. Ipswichian—a flake *cum* core industry with the flakes predominating—which is the earliest of the Palæolithic industries in Britain has in recent years been shown to date in terms of absolute chronology to as far back as 590,000 years.

In terms of absolute chronology it is now possible to allocate the 'Abbevillian' in Western and Central Europe definitely to the period between 540,000 and 460,000 years before the present. The work of De Terra and Patterson in North-Western India has established a correlation, though highly tentative, of the North-Western Indian Pleistocene with that of Europe and prehistorians now generally believe that early 'Acheulian' appeared in North-Western India at the same time as in Europe (Penultimate Interglacial) and that the 'Levalloisian' technique in both regions also appeared about the same time. One feature of South African prehistory revealed to us in recent years by the studies of Van Reit Lowe, Goodwin and Cooke is that in that country it is at any rate difficult if not impossible to

separate core from flake industries. In China the most remarkable discovery has been that of the Palæolithic industry of the Choukoutien man (Mid. Pleistocene) consisting of lithic and bone implements showing affinities to the 'Clactonian', 'Tayacian', 'Mousterian' and even upper Palæolithic—a purely flake industry with no hand-axes. In India the period witnessed the discovery by De Terra and Patterson in the Punjab and in Kashmir a new Palæolithic culture distinct from the classic hand-axe culture and called by them the Soan culture, an essentially flake culture with its ramifications extending to peninsular India.

Rust's discoveries at Meiendorf and Stillmoor, north of Hamburg, have demonstrated that man's first appearance on the frozen plains of Northern Europe must be dated to late Magdalenian times. In Iraq in recent years implements of the lower Palæolithic (Mousterian) and upper Palæolithic (Aurignacian) leading on the Bronze Age and later have been discovered in the Hazar Mird Cave, and the gap between the Mousterian and Aurignacian Cave-dwellers, traces of whose existence were for the first time detected by Professor Garrod twenty years ago in the Khurdish mountains and the agricultural communities of Tell Halaf and Sāmarra, is now being gradually bridged. In 1939 Professor Shevket Aziz Kansu discovered flake industries, in *situ* in high gravels near Ankara, with tools some showing 'Levalloisian' technique and some reminding us of European Mousterian. Dr. Garrod's discovery of three layers of Middle Aurignacian implements in the cave of Batcho-Kiro near Drenovo, Bulgaria, has revealed the connection between the Aurignacian of Khurdistan, Palestine and the Crimea with the Middle Aurignacian of Central and Western Europe. In fact it is now possible to view the Neolithic cultures of Europe as but late manifestations of related cultures from Hither Asia across the plateau of Turkistan and the Balkans. Nobody now seriously doubts the origin of the use of metal tools, not to speak of stock-breeding and agriculture in the near East.

Chronological association of human remains with human industries now definitely connects 'Mousterian' with *Homo Neanderthalensis* and upper Palæolithic blade industries with *Homo Sapiens*.

Leaving the remote past and coming to nearer times we now know that the Al-Ubaid people came to Mesopotamia from the highlands of Iran, that writing began in Iraq in the Uruk period (*circa* 3500 B.C.) and was later introduced into Egypt, and that the Uruk people with their red, black, or grey pottery came from Central Turkey or Anatolia. Most remarkable, however, of the Archæological discoveries in recent years has been that of the stages in the growth of material culture from Neolithic including pre-Halaf through Tell Halaf to Al-Ubaid in South-Western Asia, in the course of excavations on a hammock of earth by the side of a stream near Mersin in the Cilician plain between the Taurus and Amanus mountains.

In America Harvard geologists have been able to show that man reached the New World towards the end of the last glacial epoch. The New World can now show man-made objects together with remains of extinct fauna of the Pleistocene period and on an extremely conservative estimate it must be admitted that the men who made the Folsom points and were the denizens of the Western plains of the United States lived between 10,000 and 8,000 years ago.

The achievements of Soviet Russia in the field of Archæology in recent years have placed the vast Eurasiatic territory of the U.S.S.R. securely on the archæological map of the World. In the Western Caucasus, sites have been dug showing the beginnings of 'Abbevillian' and 'Acheulian' periods. The existence of 'Mousterian' settlements as evidenced by the discoveries at Desna and Ostrovski in the European part of the U.S.S.R. is a fact that can no longer be disputed. Mousterian settlements have also been found in Uzbekistan in association with a Neanderthaloid child in a rock shelter of Teshik-Tash. Palæolithic stations have been located and studied in the Urals and in Western, Southern and Eastern Siberia. A remarkable discovery has been that of dwellings of Aurignacian-Solutrean-Magdalenian hunters along the Don. Late Caspian caves in Crimea show cultural links with the Mediterranean. As a result of the work of Soviet archæologists, Neolithic stage in the forest zones of Eastern Europe can now be dated to the second and even to the third millennium B.C. Much light has been thrown on the 'Tripolje' culture of the fourth-third millenium B.C., its architecture and the ways of its people.

Kizl-Vank in the Caucasus has revealed painted pottery belonging to the Bronze Age (third millennium B.C.) showing affinity to Susa. The contents of the big Kurgans in Georgia in Transcaucasia belonging to the first half of the second millenium B.C. give us a complete picture of a civilization that was in contact with Hillite Asia Minor and Mycenaean Crete. Research in Siberia has penetrated the several phases in the Neolithic and Bronze Ages there. Keltemenian sites of the Bronze Age in Central Asia connect the culture of the early bronzes of Khwarazym with the Afanasevo which is the first phase of Siberian Bronze Age on the one hand and the painted pottery culture of Anau in Turkestan on the other.

Side by side with increase in the volume of archæological discoveries during the period under review there has also been an enormous development in the technique of archæology. Archæology is now "a serious science, not a mere exciting pastime". Americans these days use kite balloons for vertical photography. They use portable cylinders of compressed air to blow off mud covering bricks. Aerial photography has established itself as a valuable aid to the archæologist in locating ancient sites. Dr. Godwin's technique of pollen analysis provides a relative time-scale for dating objects found in peat or peaty deposits. Petrologists have by their analysis of the material of stone implements, particularly stone-axes helped the archæologists in mapping out prehistoric trade routes.

THE FUTURE

Our knowledge of man's past in spite of what has been achieved by archæology is still very little, fragmentary and incomplete. Mother earth keeps away from us many a secret about man which the science of archæology alone can reveal.

Tree-ring analysis which has been employed with remarkable success in the New World is a method that can usefully be adopted in other parts of the world, particularly, temperate Europe or Egypt for purposes of dating historic objects.

While Abbe Breuil regards the Abbevillian from Moroccan and Portuguese beaches as of Pre-Pleistocene Age the exact relation of the artefacts to the beach deposits needs to be determined before the verdict can be finally accepted. We still do not know anything about the man that made the Clactonian, or the authors of the 'Madrasién' hand-axe culture and the Soan culture of N.-W. India. The ascription of Levalloisian to the Neanderthal man in spite of evidence from New Jersey and Mount Carmel is far from certain. The evidence of Swanscombe and Galley Hill would no doubt seem to indicate that hand-axe industries belong to the Homo Sapiens Group, but more data are needed to confirm the theory.

Prehistoric research in S.-W. Asia must doubtless begin at the point where it was left by Professor Garstang in 1937-38. The fact that the Sumerians built their temples on artificial hills probably indicates that they were originally mountain people. But the Sumerian problem still baffles us. We do not

yet know their background or the beginnings¹ of their culture which full-blown meets us in South Iraq. Another problem that awaits solution is the possible connection between hand-axe cultures of Africa as a whole and India during Lower Palæolithic or second Interglacial period. In America the major task in the field of Archæology is to determine the manner in which man arriving there in the closing period of the last glaciation got dispersed through the country and the growth of the different cultures. In India though the ramifications and affiliations of the Harappa culture are better known to us now than a decade ago the Harappa script itself has still to be deciphered.

With greater use of aerial survey, desert regions all over the world can be made to yield the vestiges of lost civilizations. The Use of Aerial Survey in tracing Past Civilizations that they now entomb. Scores of deserted sites in Balk in Afghanistan and in North Caucasus await the excavator's spade. Archæologically speaking, Greece is far from being exhausted. Despite Schliemann the tombs of the Trojans are yet to be found. Etruscan sites in Italy need to be studied carefully. Their language has not been translated yet; their origin is still unknown. Philology having failed, Archæology alone must solve the Aryan problem. The Hittites still constitute a puzzle. Who were the Ahhiyawa of the Baghas-Keui tablets who raided the coasts of Asia Minor and harried the Trojans as well as the Hittites! Iran has only been nibbled at here and there. South America from the point of view of archæological research is still a dark continent. Excavations in British Honduras can enlighten us on the different phases of the Maya culture. Africa beyond Egypt is still little known.² The middle of the Eastern Islands awaits solution. Though much has been accomplished in the field of archæological research and excavations much yet remains to be done.

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¹ Occult tradition has traced the beginnings of this culture to 30,000 B.C. See pp. 109-115, this part.—ED.

² See pp. 115 to 121, this part.—ED.

THE MEANING OF SYMBOLS

A PSYCHOLOGICAL AND PHILOSOPHICAL SURVEY

BY MARGUERITE MERTENS-STIENON

AS far back as Tradition takes us we see symbols being used for the teaching of Sacred Science. However, we read in *The Secret Doctrine* that

there was a time also when the Wisdom-Religion was not symbolical for it became Esoteric only gradually, the change being necessitated by misuse and by the Sorcery of the Atlanteans.¹

This refers to at least one million years ago. The theosophical teaching concerning the presence of man on earth, places this event far back in the ages, contrary to some views of Science, whose statements are based on purely material and therefore incomplete investigations, so many cataclysms and sinking of continents having taken place. More than once, because of new factors coming to its knowledge, Science has been obliged

to add milleniums to the span of time during which it had declared that man had lived on earth. And so has orthodox religion, which could not maintain its earliest teachings in face of scientific evidence, except by confining itself to dogmas to be believed blindly. The fact is that Science calls *Primitive* men those that Theosophy considers to be degenerated types of once highly civilized races. It is the ignorance of the cyclic law which causes those errors. Science believes in a straight-line evolution, while Theosophy teaches that evolution proceeds through cycles which always present a phase of growing and a phase of decline. Every cycle is in advance on the previous one, so that instead of a straight line it is a spiral which symbolizes the evolutionary process. A Race is such a cycle, as also is a sub-race or even a human life.²

¹ S. D., III, 74.

² For cyclic law, see "Chemistry", Part II, this series.—Ed.

For many, tradition and myth are only fables, although some great scientific minds do not share that opinion. To quote Legend
 Jean Sylvain Bailly,¹ "I make great case of ancient traditions preserved through a long series of generations". Voltaire, the great sceptic of his day, according to *The Secret Doctrine*, "had like Bailly, the conviction that Hesiod's *Theogony* is based upon historical facts".² Says Pococke, "Myths are now proved to be *fables*, just in proportion as *we misunderstand* them; *truths*, in proportion as *they were once understood*."³ Augustin Thierry admits that in legend alone rests History
 real history; for he says, "Legend is living tradition and three times out of four it is truer than what we call History."⁴

Theosophical teachings rest on Tradition, especially that of India, because India is the cradle of our fifth Race, the Aryan, which started one million years ago.

The traditions of the South of India uniformly ascribe its civilization . . . and the settlement of civilized Hindus [the fifth Race] to the conquest of Lanka by Rama [*Vishnu Purana*, III, 318]—the victory of the Sons of Gods over the Atlantean sorcerers.⁵

The fourth Race, the Atlantean, still had then a brilliant civilization, although for some time it had been degenerating.

Some of the symbols and myths forming the spiritual teachings of our fifth Race, have their origin in, or are related to, those far-off ages of the Atlantean days, and even those of the middle of the third Race. It is likely that some symbols of a phallic character in the cults of Osiris and Mithra, and in those of old India, date from the time when hermaphrodite
 Humanity
 hermaphrodite humanity was separated into two sexes, about 18,000,000 years ago,

an event which, physiologically, has now become the Mystery of Mysteries among the world problems. . . . It is in this that lies buried the key to the symbolism of old, the true focus of national thought and the strange dual-sexed images of nearly every God and Goddess in both pagan and monotheistic Pantheons.⁶

¹ *Lettres sur l'Atlantide*, p. 15, quoted in S.D., II, 785.

² S.D., II, 821.

³ S.D., I, 362.

⁴ French historian (1795-1856) quoted in S.D., I, 739.

⁵ S.D., II, 235.

⁶ S.D., II, 235, and also 804-21.

In relation to this, H. P. B. quotes Sir William Drummond, who says in *Œdipus Judaicus*, "The truths of Science were the arcana of the priests because these truths were the foundation of Religion". We can understand that, at the origin, the generative organs were considered sacred. It was at the time of the separation of the sexes that the reasoning mental Principle developed in man, uniting in him the spiritual nature to his lower Principles.

Mankind having reached . . . that turning point where its spiritual nature had to make room for mere physical organization, had to *fall into matter* and generation.¹

Man then became *conscious* of his creative faculties, mental as well as physical, and, consequently, one can conceive the sacred character of that newly evolved creative function. Now that humanity has lost its original purity, we are shocked by those symbols and we accuse those races of being degraded. It is true that, even in ancient days, there have been cyclical periods of decadence and materiality. All religions have their origin in spirituality and end in materiality, and that is why there is, periodically, a need for a new spiritual dispensation. The beautiful symbols of Paganism, like many others, have been grossly disfigured and materialized even before our modern times.

The Ancient Wisdom, Theosophy, as is shown in *The Secret Doctrine*, finds in the old symbolism profound teachings concerning cosmic and human origins, these teachings having been given by wise Teachers, far in advance of the current stage of evolution of the time considered. They were founders and leaders of races, who always guided humanity and taught it according to its level of development, just as a mother guides the first steps of her child. The child evidently falls when first left to itself, but, in order to grow, it must rely on its own forces and abilities. This is the case with humanity. In our fifth Race these teachings were always given under symbolical form, we shall later see that symbols belong to the fifth Principle.

For men like the Chaldeans, who were living an out-of-door life, and who had an opportunity, under favourable climes, to gaze into the depths of the heavens, the movements of the planets and constellations, as seen from the earth, were used as

¹ S.D., III, 295-96.

symbols. Those stars and constellations were given the names of characters taking part in mythological dramas, and represented graphically with the attributes connected with the nature of the spiritual Power they represented. There still exist celestial spheres where we see, for example, a man struggling with a serpent; a warrior holding in his hand the head of a monster that he has just cut off; a princess with broken chains still fastened to her wrist; a winged horse, and so on. Some of these old spheres have been preserved by the Greeks who gave Greek names to the constellations, as the Arabs gave them Arabic names; they have been tampered with a good deal, especially by the Greeks. The Zodiac of Denderah,

The Zodiac of
Denderah

whose reproduction is at the Musée du Louvre in Paris, is another specimen. Those symbolical constellations were 36 in number, plus the 12 Signs of the Zodiac,

which makes 48. Three constellations were related to each Sign. If to the number 48 we add the synthetic oneness of the sphere which contains them all, we obtain 49 (7 times 7), a number well known in cosmic as in human symbolism, being the fundamental septenary basis of the solar system, and of the constitution of man complete, (physical, psychic and spiritual). The origin of those symbolical constellations is said to be "lost in the night of time"; and when Dupuis, a great scientist and astronomer, member of the Institut de France at the time of the French Revolution, proves in a very elaborate work¹ that all mythological fables of all peoples are related to those constellations (decans) and to the 12 Signs of the Zodiac, and have consequently an *astronomical key*,

An Astronomical
Key

he nevertheless fails to explain the symbolical figures connected with the constellations. With the knowledge of Theosophy those fables are seen to express

cosmic universal laws, true at all times, or events in the evolutionary path of the world or of humanity, and one becomes convinced that great spiritual Teachers invented those stories—a wonderful system it is—so as to keep those eternal truths indelibly written in the heavens.

The symbols of the 36 constellations were combined with the action of the seven great Planetary Powers, Intelligences, who rule over the seven sacred Planets. When we speak of Planetary Intelligences we

¹ *L'Origine de Tous les Cultes*, 10 volumes, by 'le Citoyen Dupuis.' "It is an absolute necessity to apply the astronomical key to Ancient Theology, as without it the sanctuary of the Gods remains closed for us. Mythology in its origin is a work of science; science alone will explain it" (Vol. IX, p. 235).

must not think of personal Gods. A Planetary Intelligence—Saturn, Jupiter, or any other—is a Host, a whole hierarchy of forces, whose numberless agencies act on all planes of existence, from the most spiritual to the most material. They work in us, are part of us, our very essence; they form our seven Principles, and *The Secret Doctrine* gives us the correspondences between our seven Principles and the "Planets". Beyond them were the twelve primordial Hierarchies pictured in the twelve Signs, twelve Creative Orders personified in all mythologies. And the Sun, at all times, symbolized the One Great Power, Head of our Solar System, whom we call the Logos, the "Word" of Christianity. The Moon, which reflects its light, was the feminine and motherly aspect of Nature. The Sun, seen from the earth moving through the twelve Signs, marked in each of those twelve stations, stages in the manifestation of the World, which were, in Greece, represented by the twelve metamorphoses of Zeus or Jupiter.¹ Everybody has heard of the Chaldean Astrologers, but one is generally acquainted with the degenerated aspect of their sacred Astrology.

This science was, of course, of much deeper import than the mere casting of horoscopes and the prediction of petty happenings to the individual or the community. It was a most profound research into cosmogony and celestial correspondence, *uniting the evolution of man with that of the universe of which he is a part*, and penetrating the veil of many facts in nature which are still mysteries for the modern world.²

Of course, as in Egypt, the knowledge of that deep science of Astrology was reserved to the initiated priests, and the fables given to the masses were addressed to the physical senses and to the emotions, because the consciousness of that race (part of the Iranian stock) was focussed at that level. As proved in the work just quoted, the consciousness of man evolves, and as it grows, the horizon of his perceptions enlarges, and this not only in the course of the life of a separate individual, but also when humanity as a whole is considered. The learned philosophical and metaphysical interpretations of those fables have come later in races which were essentially mental.

¹ For the elaboration of all this see *Studies in Symbolism* by the author of this monograph.

² *The Next Step in Evolution*, p. 32. (The italics are mine.—M.M.S.)

Each great Race is on a different rung on the ladder of spiritual evolution, each of its seven sub-races repeats the same ascending scale, as do the Races, within the zone of the consciousness of the Race. And the same septenary process is repeated within the sub-race, through the seven minor cycles of nations forming that sub-race, (cycles within cycles). Consequently, each Race evolves more especially one Principle, and the seven Races follow in their evolutionary unfoldment the same order as does a single individual during his life, this order being: Perception, Action, Emotion, Analytical Mentality, Synthetic Mentality and Social Sense, Intuition and Cosmic Sense, Will and Spiritual Self-Realization.

We could not do more here than sketch in these few words this interesting theory, but we shall touch on some of its applications to symbolism. In order to understand it well the student should read and study *The Next Step in Evolution*¹ that we have just mentioned and quoted.

If, following the teachings of Theosophy concerning the division of humanity into seven Races—a division based more on the development of consciousness than on ethnical, physical types—we examine the fifth Root-Race, called the Aryan,² we see that, as a whole and fundamentally, it has to evolve the synthetic mind and the Social-sense. However, each of its seven sub-races colours this fundamental characteristic with a sub-influence. This will be rendered clear by the following table borrowed from *The Next Step in Evolution*, p. 9.

Social Mind
Consciousness

ARYAN RACE : <i>Social Mind Consciousness</i>			
1st sub-race,	Indian (Hindu)	Social-Mind	focussed in
2nd sub-race,	Egyptian (Arabian)	Social-Mind	³ PERCEPTION
3rd sub-race,	Chaldean (Iranian)	Social-Mind	focussed in
4th sub-race,	Mediterranean or Keltic	Social-Mind	ACTION
			EMOTION
			focussed in
			ANALYTICAL MIND

¹ Vide Bibliography, this monograph.—Ed.

² The Aryan Race has nothing to do with the Nazis' so-called Aryan Race.

³ Perception for the Race is the taking consciousness of itself, and establishing the elements of its basic structure, those elements being the seeds of its septenary unfoldment.

5th sub-race,	Nordic (Teutonic)	Social-Mind	focussed in SOCIAL MIND
6th sub-race,	Now appearing	Social-Mind	enlightened by INTUITION
7th sub-race,	Future	Social-Mind	directed by the WILL

Now, it is a fact that the mode of symbolism changes through the ages according to the stage of development of the consciousness of the Race. We can only give a few hints on that part of our subject.

In those cycles when consciousness was fixed in the fourth Principle which man has received from the animal, in its instinctual nature,¹ the Gods, while human in consciousness, have animal forms. It is the case for the Chinese, a fourth offshoot of the fourth Root-Race (the Atlantean); also for the Egyptians who received their symbolism from the Atlanteans.

Animal Symbolism In the fourth sub- and sub-sub cycles of the Keltic sub-race (the fourth of the Aryan Race) we see the animal symbolism recurring. (Æsop in Greece; La Fontaine in France.)

We have seen that the symbolism of the Chaldeans (third sub-race) appealed to the emotions (third Principle). We might say the same, to a certain extent, of that of Ancient Greece, which marked the emotional stage in the Keltic (Analytical-mind sub-race). Its mythological fables are certainly of an emotional character, and beauty had a great place in its cults. However, we find, in Greece, the analytical Keltic fundamental influence. Pythagoras uses the geometrical symbolism; and also music under its mathematical aspect, sound being based on numbers. He elaborated

*Geometrical
Symbolism*

a system called the "Music of the Spheres". The distances between the planets and their distances from the earth, determined their proper note, and he thus established an harmonic progression of tones and half-tones. "According to that progression was distributed, in the different parts of the world, the divine Force called 'Fire Æther', which was preserving harmony between the worlds. That progression had 36 terms", (the number of the symbolical constellations, and of the Tattvas² of Theosophy). "The first

*The Music of
the Spheres*

¹ This Principle is rudimentary in animals. Men are perfecting it, and are not to be compared to animals, for, in man, consciousness is individualized and joined to a spiritual Ego, while in the animal consciousness is specific, *i.e.*, belongs to the group.

² Forces in Nature; 36 in the manifested world, 49 in all.

term was 384, representative of the central unit; and the sum of the terms was 114,695 ".¹

Out of Pythagoras' theories, Plato evolved an abstract philosophical symbolism. Both Plato and Pythagoras discard the earlier myths as being primitive, unworthy of a cultured people, although they emphasize the unity of the truths conveyed by the different systems of symbology. We also find, in Greece, very learned philosophical commentaries and minute analyses of Homer's and other mythological fables, by Proclus, Porphyry, Plotinus and others.

During the "mind" period of our Middle Ages, we find the alchemical symbolism, intellectual in its presentation, highly spiritual in its inner aspect. The truths are here symbolically veiled under the material appearance of chemical experiments. It is interesting to find that, in the tables of theosophical correspondences between the Principles and the Planets, Mercury, whose metal is quicksilver, corresponds to spiritual intuition (Buddhi), and that in alchemy it is through mercury that Saturn (lead), corresponding to the lower mind, has to be transmuted into gold. Gold is the metal of the Sun, and in the tables of correspondences the Sun corresponds to the spiritual will (Atma). I am told, and this is still more interesting, that, in the tables of radioactivity elaborated by modern science, (chart of Professor Soddy), it is quicksilver, the metal of Mercury according to all traditions, which is expected to produce gold through radioactivity.²

In the eighteenth century, during a new cycle marked in France by the French Revolution, a time when the Social-sense had to begin developing in an "analytical-mind" nation, we have the symbolism of Masonry, based on human brotherhood. Masonry was a renovation of a most ancient form of Mystery-symbolism.³ Its deep spiritual significance has been revived in some modern forms of Masonry.

If the Founder of Christianity draws the symbol of the Eucharist out of the Mystery-teaching to express the Social consciousness of the Race he wishes to found, it is because that symbol belongs to the Social-sense—to the Social-mind sub-race of the Social-mind Race. That symbol had been part of the Mystery-teaching

¹ *L'Origine de Tous les Cultes*, Vol. II, p. 182.

² This refers to the possibility of production of gold from mercury by the expulsion of one helium atom.—Ed.

³ C. W. Leadbeater, *Glimpses of Masonic History*.

before ; it served there to educate in an analytical-mind Race the *still subjective* Social-sense, in those who were in advance of the Race.¹

These élite were the occultists of the time, who had to help in the advent of the coming sub-race, and begin to foster in the world its new consciousness. Edward Carpenter tells us that "Eucharistic rite was held in commemoration of Mithra, and of the Phrygian God Attis".² It existed in a crude form in the rites of other ancient peoples. Gerald Massey tells us that "there is, or was, a fresco in the Church Bocca della Verita at Rome, in which the Goddess Ceres was portrayed shelling corn, with Bacchus squeezing grapes, to provide the elements of the Eucharist for a table below".³

The Christian Eucharist is the symbol of the unity of the Divine Life being divided among the multiplicity of human beings ; it is made *one* again through the brotherly love of the disciples. It is really a Social-sense symbol, and, for the starting fifth sub-race it was "an outer expression of that which pressed for manifestation and self-realization within".¹

A somewhat similar idea is expressed in the symbolism of Osiris torn by Typhon into 14 fragments ; those fragments are dispersed and searched for by Isis who succeeds in gathering them together, and thus prepares the resurrection of Osiris. Here the fable has rather a cosmic meaning. We see in it the symbol of the Oneness of the Divine Life manifesting Itself in the multiplicity of all the forms that exist in the world. The number 14 is easy to understand when we think of the seven Planes of existence, under their dual aspect of life and form. Typhon is the Power connected with Matter, that matter within which Life is divided. Isis is the feminine Principle of spiritual intuition, (Buddhi-Light) through which *alone* the Oneness of all things can be realized, under the great diversity of forms.

With the Orphics, it is Dionysus or Bacchus-Zagreus who is torn into pieces by the Titans, his fragments being burned and again dispersed. His heart (Life and Love) is saved and preserved by Minerva (the Wisdom of Buddhi, or spiritual intuition

¹ "Symbolism and Psychology", an article by Professor J. E. Marcault in the Quarterly Bulletin of the Theosophical World University (March 1930) out of which some of our data are taken.

² *Pagan and Christian Creeds*, pp. 51, 67.

³ *The Book of the Beginning*, Vol. II, p. 246.

until the God is restored to his pristine life and integrity. From the burning ashes of the Titans at whom Jupiter had hurled his thunder, *mankind were produced*. We should add that the Titans *had eaten the flesh* of Dionysus. And Proclus says, "The Titans and Giants produce the demiurgic powers into multitude, divisibly administer the affairs of the Universe, and are the proximate fathers of material natures".¹

In India, the dismemberment of Prajapati has the same meaning. Similar symbols thus express the same essential truths in the different traditions of all peoples. I say similar symbols, not *identical*, because each Race, each evolutionary period, has its own presentation which varies in its details. The Gods bear other names in different countries, and even in different parts of Greece or Egypt, but the meaning of the story is the same, for all these legends are but veils under which can be found the truths of a great, unique, primordial Tradition.

Before we analyse more closely what a symbol really is, it is essential to differentiate two forms of symbols.

The Symbolism of Dreams Modern Psychology has gone far in its explorations of the sub-conscious mind; it has discovered that the symbolism of dreams, when analysed, is expressive of hidden "complexes", which are the result of repression. They have organized themselves into some kind of tumours in the psychic organism. And it has been proved that the sub-conscious mind always expresses itself through symbols, in dream-consciousness. All the facts which, through repression, have disappeared from the field lit by the concentration of the clear waking consciousness, reappear as symbols, when that concentration ceases, as during sleep. Now, it is necessary to emphasize a very common error against which Professor G. E. Monod-Herzen warns us.² One often thinks that *all* symbols have their origin in the sub-conscious, and one ignores a higher kind of symbols which originate in the *super-conscious*, sometimes called the *Unconscious*.

The Sub-Conscious and the Super-Conscious It is the field which is still subjective at any stage of evolutionary development, and constitutes the store-house of the *future* conscious knowledge of mankind. This field forms an undifferentiated oneness, an absolute, and it is *there* that all really spiritual symbols

¹ *The Mystical Hymns of Orpheus*; Proclus' commentary on Plato's *Republic*; Taylor's translation, p. 71, note 61.

² "Symbolisme et Psychologie", an article in the French Revue Théosophique *Le Lotus Bleu*.

originate, affecting in their symbolical objectivation a whole range of more or less refined expressions. This explains the relative realization of that great symbol called God, a conception which varies with the level of consciousness, from the God of the savage to that of the philosopher. Is it not a fact that man has always created God *in his own image*? Here again, as for the sub-conscious, the only way subjective notions can be expressed is through symbolical form. In both cases those symbols express notions which are not clearly perceived by the waking consciousness. There is however this difference, that the sub-conscious notions are part of the objective field, though they have been, for psychological reasons, pushed back by the individual in the crepuscular regions of the sub-conscious, where human consciousness becomes diffused within the *collective* sub-conscious. In the case of the super-conscious, the symbols represent notions which belong to a greater light, though it is *still* darkness for the waking consciousness at its particular stage of evolution. One never should bring down sacred symbols to the level of the collective sub-conscious. The symbolical dreams caused by the sub-conscious have a personal character, while the symbols of the super-conscious field are spiritual and universal. In this monograph we only deal with the latter.

Always, at the outset of a Race or sub-race, we see, towering over the humanity of their time, great spiritual Teachers ;
 Spiritual Teachers we can witness them, through the ages, in India, in Egypt, in Greece, in China, in Asia Minor, and their teachings are still alive. Have we not the Vedic, the Hermetic, the Orphic, the Homeric, the Judaic and the Christian Traditions, without counting those of Lao-Tse, of Zoroaster, of Buddha, of Muhaminad and others? If we study them somewhat, we shall recognize in their symbolical teachings the same truths under different aspects, and link the biblical Tree of Life to Yggdrasill of the Norse legend, and to the Ashvatta of India ; the liquor of the Grail to the Soma of India and the Homa of Persia, and so on.

Every great Teacher is, in advance, the perfect type of the Race he founds, and in his consciousness the Race is going to grow in the course of its evolution. But his consciousness being still subjective in the masses, in order to be understood, even so imperfectly, he has to give his teachings under a symbolical form. The symbols chosen are always adequate to the level of consciousness of the Race to which they are given. Those Teachers thus help in the masses the objectivation of notions which must gradually become fully

Teaching in
 Symbols

objectified. It is a slow process. Shall we say that the Christian race has yet perfectly developed the Social-sense and the brotherly love that Jesus taught? We can, however, follow the development of that Social-sense in the world today, in spite of past debts which have to be paid and which weigh heavily on the world.

We have now tried to explain, according to the theosophical teachings, the origin of the great myths, sacred fables and parables which rendered possible to human consciousness the assimilation of abstract truths.

All sacred symbols seem to be related to the science of Theosophy, and because of the law of correspondences that it expounds, symbols can find an interpretation at different levels of manifestation and on different planes of consciousness. There is a plurality of meaning to every symbol,

Seven Keys to
Symbols

and we understand therefore what Madame Blavatsky means when she speaks of seven keys to symbols. (See Appendix A.) Dupuis, mentioned before, found how to

use the astronomical key and thought he had discovered the whole truth. He did not realize that astronomical phenomena are themselves symbolical of a higher range of spiritual happenings. In the same way most of the mythologists see in myths only natural phenomena: clouds, waves, rain, thunder, the dawn, storms, etc. They also fail to see that physical nature is but the mask of the Divine, and is consequently a vast symbol in all its

Plurality of
Meaning

manifestations. Surely the causes are not to be found in physical nature, at least not the primordial causes. All the different meanings which can be given to symbols do

not exclude each other; on the contrary, they harmoniously express the applications of the same principle at different levels or in objects of different orders, and they all find their abode in a fundamental Synthesis. That is why a symbol contains such a richness of meaning, and why one can progressively discover more and more in it, as the mind grows and the spiritual powers increase.

The Mystery-
Language of the
Initiates

Symbolism is, according to *The Secret Doctrine*, the Mystery-language of the Initiates. And, as we allude to the law of correspondences, we must stress this important fact that exact correspondences exist between the solar system and man himself, whether he is considered as consciousness, or under his physical aspect. The same symbol can consequently be applied to the Cosmos, to evolving Races of men, and to an individual.¹

¹ Theosophical students have started establishing those correspondences, using them in the interpretation of symbols. See Bibliography.

True Symbolism is a Fact in Nature

True symbolism has not been artificially invented ; it is a fact in Nature, and to use a symbol is not merely to compare things of a somewhat similar nature, but to establish fundamental relationships between those things and a Universal Principle, thus linking together the material, the psychic and the spiritual worlds. A symbol in its essence is universal, and, in a relative sense, that which is universal applies to all cycles. (See Appendix B as to a plurality of meaning in symbols.)

Esoteric Symbolism

As we have seen, symbolism evolves with human consciousness and economic conditions, but it is essential to realize that at all times esoteric symbolism is in advance of the Race, and prepares the new age which is coming. The orthodoxies of the past, having usually clung to the letter of the once living teaching, have thus gradually built round the latter a rigid shell, and they always struggle dogmatically against the new spirit. They fear it because they have identified their consciousness with the *form* of the old, and not with its *life*. The esotericism of one age becomes partly public property in following ages, and then the initial teachings degenerate and become distorted and reviled ; they lose their universality, for the sap of the Tree of Life ceases to flow in that special branch which, in course of time, withers and decays. Dogmas always kill life, whether they are scientific or religious. This explains how symbols expressing facts related to cosmic manifestation, have been, through the vision of orthodox religion and orthodox history, interpreted as having their genesis and their finality in a material world *only*. They have been erroneously fixed in time and space, and prejudiced knowledge has thus belittled great truths. One has ignored that

Dogmas Kill Life

all civilizations in their mythologies ever used the configuration and peculiarities of their countries to symbolize Cosmogonical events, while their legends enact the History of the Universe. The Egyptians made of their Nile and its Delta a Cosmogonical symbol. The Hindus did the same with the Sacred Lake of the Himalayan Mountains from which flow the Four Sacred Rivers. For the Greeks, Hellas was always a symbol of the higher spiritual Worlds, and the War of the Gods is described as having taken place there. The symbol of the North Pole, and that of the Christian Jerusalem, to take at random, are too well known to be stressed, and we might multiply such instances.¹

¹ Extract from a leaflet issued by the Research Group for Symbolism of the Theosophical University, 1932.

All religions have their source in the Universal Tradition, of which each of them was once a *relative* expression, veiled so as to suit the need of the time.

From what we have said, a symbol might be defined as being a concrete representation of an abstract reality, thus presented because the consciousness of man could not yet receive it in another way. Or, we might say that symbols are germs of truth out of which evolution will build stable forms of manifested knowledge. Professor Marcault once called them "the Akasha of the Mind".¹ The mind, evolving gradually with the conditions of life, builds knowledge out of those akashic seeds. But a seed must die in order to permit the development of its own germ. Each layer of the seed has thus to die in turn so that the purpose of life be fulfilled.

It is but slowly that the consciousness of man has risen on the ladder of his embryonic faculties, and *now* for the first time, in the sixth sub-race just coming into existence, it reaches the fringe of the level of intuition (Buddhi). The intuition is little by little shining through the intellect. In the sixth Root-Race which will be formed, according to our teaching, in the course of the present sixth sub-race, *pure* Intuition will use the Intellect as its instrument.²

At the level it has now reached the consciousness of man knows itself to be energy, the dynamism of life, whereas formerly it remained identified with the faculties that it used: emotion or mind. Life becoming thus conscious of itself in the thought of man, the latter begins to perceive life in all forms, and as a consequence, an imperious wish is born in him to know more about that life outside himself, and to liberate the spiritual energy imprisoned in forms. We see the proof of this change in all the branches of modern science. Zoology and botany belong to the past; they were the study of forms, of the outer physical characters of the species. They are now replaced by biology, the study of the reactions of life within the forms to outside stimuli. Chemistry has reached the limit of its analytical investigations in physical matter, and it has merged into physics, the study of life forces. In psychology Bergson has discovered that consciousness *is life*. And do we not see the modern physicist pursuing life in its

¹ The synthetic primordial substance out of which emerge the elements and which is consequently the Source of all things. A plenum.

² *The Next Step in Evolution*, Chapter X.

last physical entrenchment, in order to discover and use the power that the atom ensouls? That is why there is in our time a revival in the study of symbols, in order to detect the life hidden within them, and to know the secret of the Eternal Sphinx.

It is intuition which renders possible the realization of the oneness of life with all its implications in the everyday life, for from this oneness nothing can be excluded. With this knowledge there can no longer be a duality of higher and lower, of Spirit and Matter. Scientifically matter has now no limit, it merges into energy. Duality means

Duality Causes Conflict opposition and has always caused conflicts, divisions and wars. If these conflicts have to disappear in the world, the conflict of our own duality has to disappear in ourselves and this can only happen by the union of the thinking principle (Manas) with the intuition (Buddhi).

This new consciousness is taking its place in the world for it does not any longer belong to the future and we can see all kinds of changes which accompany its birth if we but want to see and are not blinded by old prejudices.

But again, the new values frighten those who cling to the old forms and have become the prisoners of their own creations which they thought were eternal. The constant movement of life takes, at a time like ours, the appearance of a tornado, scattering about the old values for which the new humanity has no longer any use.

We have heard, and still hear much about individual freedom and individual rights, and certainly this freedom and these rights cannot be denied and are necessary. It is their abuse which is wrong as when they are claimed in order to oppress other individuals whom we use to serve our personal ambition and greed. Now is the time to realize, as many in fact do, that the individual fully evolved, that is, the individual conscious of Buddhi, is no longer a separate I, but lives in all others. This

The New Really Human Individual new individual, really human and no longer sub-human, can only accept a world where the free development of each is the condition of the free development of all. This is the natural consequence of the inner knowledge—not the intellectual knowledge only—of the oneness of life.

For such an individual the outer forms of symbols, necessary in the preparatory stages of humanity's education, become useless

because he has assimilated the living essence those forms ensoul.

Put Ideals into
Practice

In the same way he realizes that an ideal is only of any value if it is translated into action down here, and thus ceases to be an ideal to become a fact.

For so long we have shown ourselves lenient towards all kinds of weaknesses that we accepted without protest. For so long we have forgiven ourselves for being unjust and selfish using as a mental excuse the loftiness of our ideals. We were satisfied with the hope, maybe the certainty, that one day, in the future, our ideals would be put into practice and that meanwhile a small step was sometimes taken towards their realization.

Our Motto should
be *Here and Now*

But now the *future* of that mental age has become the *present* and we recognize the apathetic hypocrisy of such an attitude; we want to live in the present and "here and now" has become the motto.

With such a compelling conviction—the absolute of this new age—action is natural and easy since action is paramount at the beginning of a cycle. The new man feels whole, and for him only through action in the world can the oneness of life be true; he no longer tries to prove this oneness intellectually, thus escaping in an abstract world.

The new Hercules, still in the cradle, knows he can kill with his hands the two dreadful and powerful serpents of greed and selfishness, the ultimate causes of the present war, and then dedicate his life to the regeneration of the world.

Hercules, the new man, is another eternal and universal symbol.

Symbols have a peculiar characteristic on which we have already insisted. In spite of the fact that the Races to which they were given could only decipher them partially, the fundamental Truth they contain was whole, complete from the start, and probably the great Teachers who gave them knew that veil after veil would be lifted, and that the time would come when man could without danger assimilate the complete Truth. When we speak of a *complete truth*, we do not mean an absolute and final truth, but the truth that is meant to be known by the man of this earth, during this cycle of seven Races. The law of relativity applies here; each cycle has a "relative absolute" to reach, the Absolute being, in the terms of *The Secret Doctrine*, "the highest term in an indefinite series".¹

¹ S. D., III, 366.

We have said that symbols and myths have deteriorated in the course of the ages. How are we then to interpret them rightly? The answer is:

The Theosophical Key by using the theosophical key. We have in Theosophy an occult doctrine which remains secret only because it is not studied except by the few. It has all through the

ages maintained the spiritual truths undefiled, for it is not a new science but this pure Tradition, source of all passing creeds that it always transcended. Theosophy is the spirit, the essence, of all religions, and in that essence truth is present. It is in their dogmas, in their form-side that religions or mythologies become deteriorated. In Theosophy we have then the key to Sacred Symbolism. Of course there is the right way to use it; but the same danger exists for Theosophy as for Religions, if it becomes dogmatic in its assertions through its exponents. By using the key wisely we shall in course of time discover new facts. It will not come before the time, but it is essential that we should use our nascent faculty of intuition. That it is *the function which creates the organ*, is a scientific

Use the nascent Faculty of Intuition axiom, and without using our intuitive creative mind it will never develop. Nothing comes without exertion and concentration, and therefore Intuition should not be

confused with passive psychism. Man is the Thinker whose thought, illumined by spiritual intuition, can gain an insight into the inner reality of things. That true vision can only be the result of the development of the spiritual nature.

Only then can Intuition come in a flash.

To come back to symbolism, it is most interesting, at a time like ours, to remember how Madame Blavatsky wrote prophetically about "that day when all the Seven Keys shall be delivered unto Science or rather the *men of learning and research* in the department of symbology".¹ Surely the sixth sub-race, that of the intuitive mind, will discover more in symbols than even the learned men of previous races. And symbols will always

The Inner Nature of Man reveal more than words, for words, which as a matter of fact are themselves symbols, are addressed principally to the emotions as in poetry and prayers, or to the mind as in scientific expositions, while symbols are of a spiritual nature, and awaken an answer in the inner nature of man.

To sum up this part of our work, the study of symbols proves that at all times the same essential cosmic truths were taught which form the

¹ S. D., I, 343. (Italics mine.—M.M.S.)

basis of Theosophy as we now have it. However, it is good to remember what we have been told: that what we have in the way of occult teachings is only a fraction of what the infinite Wisdom keeps in store, and which will be given to man as his consciousness grows. This study also proves this axiom of Theosophy: that even in the far removed past the Elder Brethren have always watched over humanity, and by appropriate teachings wisely guided its steps along its evolutionary path. Finally, it is for us a conviction that the study of symbols in the light of the highest intelligence must help man to establish a synthesis of all his powers and faculties, and thus to perceive the relation of human life to cosmic life and realize their oneness.

Essential Cosmic
Truths

A Synthesis of all
Powers and
Faculties

It would be interesting to relate symbolism to modern science. One wonders, when thinking of the above-mentioned words of Madame Blavatsky if, when writing them, she was foreseeing the recent developments of science. Is it not true that modern science now works more on symbols than on tangible facts? Mathematical formulas are symbols. To quote Sir James Jeans, "The conceptions which for us at present are fundamental to our understanding of nature seem to me to be constructions of pure thought impossible to be realized in a way that would properly be called material". And further, "We could hardly consider the undulatory waves as being localized in space and time; they are but visual representations of a mathematical formula having an absolutely abstract undulatory character". And again, "It seems now to be beyond doubt that nature is in a way more closely related to the concepts of pure mathematics than to those of biology". However pure mathematics have not much use if not applied.

Relation of Sym-
bolism to Modern
Science

The old symbolism of space is most interesting to study in ancient traditions and in connection with the theories of modern science.¹

And here are a few words from Prof. Albert Einstein, on *The Unity of Life*:

I am a natural enemy of duality. Two phenomena or two concepts which seem opposed to one another hurt me. The supreme object of my intelligence is to suppress differences, and I am conscious by so doing to remain faithful to the spirit of science which since the most ancient times tended towards unity. . .

Towards Unity

¹ See on that subject our work; *Space and the Cross: Their Symbolism in Cosmos and in Man*.

In science the process of unification has now taken a gigantic step.

And after enlarging on this statement the Professor goes on saying :

Today space, time, matter, energy, light, electricity, inertia, gravitation, are but different elements of the same homogeneous activity. All sciences have merged into physics, and physics has been itself reduced to a single formula which translated in ordinary language could be thus expressed: *Something moves*. Those words are the ultimate synthesis of human thought. . .

If the fruit of ultimate human knowledge results in such a commonplace sentence the fault is not mine. By dint of unifying one must obtain something of unbelievable simplicity.

(Published in the French *Bulletin Theosophique*, Paris—and indicated as translated from the magazine *Evolucion* of Buenos Aires.)

APPENDIX A

CONCERNING THE SEVEN KEYS

Note 1

I quote from *The Secret Doctrine* of H. P. Blavatsky, 3rd edition. (Italics mine.—M. M. S.)

Vol. I, p. 389: Speaking of religious philosophies and their dogmas and symbols: "They can be only *approximately* interpreted, even if one discovers *three* out of the *seven* systems, namely, (1) the *anthropological*, (2) the *psychic*, and (3) the *astronomical*. The two chief interpretations, the highest and the lowest, the *spiritual* and the *physiological*, were preserved in the greatest secrecy, until the latter fell into the dominion of the profane. . . . The other two were those which dealt with the Creative Gods, or (4) *Theogony*, and with (5) *creative man*; that is to say, with the ideal and the practical Mysteries."

Here above, the seven keys are enumerated (1) *The Anthropological* is to be considered as referring to man, not only in his dense physical nature, but as to the powers concealed in his etheric double; and also to the evolution of man's consciousness through the races in which he reincarnates. Many myths refer to Races, especially to the third (Cyclops, Giants, Divine Kings, etc.) and to the fourth, the Atlantean, in which black magic was used.

2. The *Psychic* Key includes colours, especially those in relation to the different Principles, as indicated in the aura, and the "Wheels, or Chakras" in the etheric double.

3. The *Astronomical* of course is part of the *Astrological*.

4. In *Theogony* the gods stand for Cosmic Forces of all grades, "what science down here would call a hierarchy of forces". "Heat, electricity, magnetism, are *gods* in the esoteric science". (H. P. B.).

5. "*Creative man*" has to be understood as referring to the true creative power in man, called *Kriyashakti*. "It is the mysterious power of thought which enables it to produce external, perceptible, phenomenal results by its own inherent energy. The ancients held that any idea will manifest itself *externally* if one's attention is deeply concentrated upon it. Similarly an intense volition will be followed by the "desired result". (H. P. Blavatsky's comments on T. Subba Row's *Adyar Pamphlet* (No. 31) "*The Twelve Signs of the Zodiac*", p. 10.

Some myths are related to this power.

Note 2

There is no *Magic Key*. Magic results from bringing down spiritual forces to the physical plane and it can be related to "Creative Man". Magic can be thus produced through Sound (*Mantrams*); through action combined with sound and colours (Ritual); through science, (spiritual words, alchemy). H. P. Blavatsky refers sometimes to the "Metrological Key of the Symbolism of the Hebrews, which reveals *numerically* the *geometrical* relations of the Circle (all Deity) to the square, cube, triangle, etc. . . .", and in other places she mentions Keys, which are evidently secondary, namely, psycho-metaphysical, astro-chemical and alchemical. They must be included in one of the above-mentioned seven. Perhaps the *Anthropological* and the *Physiological* keys might be joined, and the Metrological could then take place among the seven.

We thus should have: 1. The *Spiritual* Key; 2. The *Theogonic* and *Cosmological*; 3. The *Astronomical* and *Astrological*; 4. The *Psychic*; 5. The *Metrological* and *Geometrical*; 6. That related to *Creative Man* (Magic-Spiritual Alchemy); 7. The *Anthropological* and *Physiological*.

APPENDIX B

NOTE AS TO A PLURALITY OF MEANING IN SYMBOLS

Perhaps the Zodiac is the best example to be taken in that respect. According to esoteric tradition, its signs stand for Twelve Cosmic Creative Hierarchies of Forces. And being hierarchical those Powers express themselves on all planes of manifestation.

Subba Row, a learned Indian scholar, gives us in his article "*The Twelve Signs of the Zodiac*" the meanings of those Signs, basing them on the numerical values of the names of the Signs, or their synonyms, for what regards the so-called "Primary Creation" of Hinduism—the self-generation and elaboration of the Divine Cosmic Powers themselves.

The Zodiac can be interpreted in terms of all cycles, and referring to our Earth Scheme, it is found to symbolize when the seventh Creation (that of man) is concerned, the Spiritual, Intellectual and Physical Pedigree of the human entity, in the course of the long pilgrimage of his Monad, as depicted in the theosophical teachings.

The Secret Doctrine tells us that the seven Races are pictured in the Zodiac, and that their cycles of duration are based on it. As to the nature of the Principle that each of those Races particularly evolves, it is fairly easy to relate it to the Zodiac. It is the correspondences existing between Signs and Planets on the one hand and the Principles which constitute man on the other that give a sound basis to horoscopy, a science which has much deteriorated because of the personal and material character which it has taken, and because its fundamental Cosmic and Theogonic nature is no longer known. The horoscope analyses the minor cycle of one individual life on earth; it shows the powers, faculties, and also the weaknesses brought by the human entity in this life, and which are the results of his past existences. It also shows the possibilities and opportunities which will help the entity concerned to bring the future into the present, that is to say, to objectify that which is still subjective, undifferentiated in his consciousness. A whole book would be necessary to demonstrate the universality of the symbolism of the Zodiac.¹

The Zodiac might be compared to a vast clock on which move at various speeds many hands marking different times: Cosmic, Solar, Planetary, Racial and Human. The organizing life, in all cycles, passes through twelve stages, always the same, and this explains the various interpretations which can be given to the Zodiac.

The twelve Signs are divided into three quaternaries, the four signs of which are representative of the four elements, Fire, Earth, Air and Water. The first quaternary is spiritual, the second psychic, the third material, the meaning of those words being relative. Fire is the creative power, Earth the substance in which it creates; Air is the spiritual result of this interaction, Water the material result. Again all those terms are relative to the cycle considered.

As a simpler example, let us take the symbol of the Ark:

At the end of every cycle there is a period of disintegration, when life abandons the form or forms it ensouled and used for a while, in order to evolve through them. This Period is symbolized by a *deluge*, when the cycle of a universe, a world, or a race is concerned. We find this symbolical deluge in all mythologies, and in all those deluges there is an Ark. I cannot treat here the subject fully, but suffice it to say that the Ark stands for the preserving power which sees to it that nothing is ever lost of that which is necessary to perpetuate life and its further evolution. The harvest of one cycle, whatever cycle it is, becomes the seed for the next, and it is through innumerable cycles that evolution

¹ See the French work: *L'Occultisme du Zodiaque* by the author. Editions Adyar, 4, Square Rapp. Paris VII—1939.

proceeds. The Puranas describe the Maha-Pralaya, and give a very vivid picture of the deluge which preceded it.¹ And it is said there: "*That* of which all things are made, the Lord by whom all things exist, He who is inconceivable. . . . reposes, sleeping upon Shesha [the Serpent of Infinity] in the midst of the Deep".

"The Creator sleeps upon the Ocean [of Space] in the form of Brahma. . . .

This pictures the end of a Universe, and here Brahma Himself represents the Ark floating on the waters. Before going to sleep, Brahma has gathered in Himself the harvest of His universe, the essence of all experiences it has gone through. During the whole of the "Night", He will keep those powers safe in His repository, His sleeping consciousness. They will again become active causes in the next manifestation, when comes the Dawn of the New Day. Then we see Brahma emanating those powers out of His very substance, and produce His mind-born Sons. Those will themselves give birth to their progeny, all those forces becoming agents in the world of effects, they themselves being the causes.

In the Mahabharata Deluge, Vaivasvata Manu is seen in the Ark with the Seven Rishis, and "all the different seeds which were enumerated by regenerate Brahmanas in days of yore". This deluge is interpreted by H. P. Blavatsky as being the end of the fourth Race and the sinking of Atlantis, as is also Noah's Deluge. The Ark is again symbolical of that which had to be saved of the Atlantean civilization in order to be used by the fifth Race.

In the first version we had a *Cosmic* Deluge; in the second a *racial* one, as also in the Chaldean and biblical deluges. However, this preserving power represented by the Ark can receive many other interpretations. For example, after a human death there follows the disintegration of the different vehicles that the human Ego had ensouled during life; the dense physical body, the etheric double, the astral or emotional body, and the lower mental vehicle. Here also the disintegration rises from plane to plane of existence. The Ark in this instance is the Causal Body, on the higher-mental plane in which the egoic consciousness preserves the results, the essence of the experience of that existence. All that is useful to the evolution of the spiritual Ego—this Ego evolving through the many personalities in whom it incarnates—is gathered there, and becomes the seeds for future lives.

Physiologically, the Ark is the womb which preserves the ovum, promise of future life, as is the seed for a plant or a tree. Cosmically it is space, which is the universal matrix, containing and preserving all the germs of life. Space is the Virgin Mother that the Spirit fecundates.

And thus, many interpretations can be given to the symbol of the Ark which, like all other symbols, can be explained with the help of several Keys, according to the knowledge and intuition of the interpreter. Some of those Keys cannot be given from outside, we must fashion them from within through our inner spiritual development.

¹ S.D., I, 398-99.

Another example is that of *Saturn as limiting power*.

The myth shows us Saturn-Cronos as a god, mutilating his father Ouranos, who is unbound space, eternity, infinity. Saturn-Cronos is Time, and when emasculating Ouranos he mutilates the Absolute and appropriates its creative power. Thus shutting a portion of the whole within a cycle of finite time, he uses that power in order to produce generation on the manifested planes, that is, in Time and Space. This cosmic symbol, again, can receive many interpretations. On the plane of spiritual consciousness, Saturn acts as the Law of Karma (he is called "Fate") which selects in the whole of the consciousness of the causal body, the special causes to be used in one special incarnation of the Ego. Saturn thus limits the field of consciousness of the Ego, taking only a fraction of its contents. In the physical body, the influence of Saturn slows down circulation; emotionally it limits the affective powers and the number of friends, those various limitations being karmic. Mentally, it helps concentration, and by the very fact of that concentration, it temporarily limits the field of thought to that of a chosen object. Saturn stands for the *I* at all levels.

As Saturn in the scale of our seven Principles is the analytical mind, it also limits the action of consciousness, keeping it on the level of concrete thought. Another power is needed to balance or overcome that of Saturn, and render the latter helpful through its steadiness and determination, instead of harmful through its sloth and lack of vision.

In Alchemy, Saturn is lead (lower mind) and it can only be transmuted into gold—the metal of the Sun (Atma)—through the agency of Mercury (Buddhi).

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SCIENTIFIC CORROBORATIONS OF THEOSOPHY

THE following is a list of some corroborations by Science of statements made, many years ago, in the classical literature of Theosophy ; they prove Science to be a great ally of Theosophy, for they demonstrate, in an ever-increasing measure, the stability of the foundations of the Theosophical Structure. These corroborations are given here only as a means to an end and not as an end in themselves.¹ They further direct our attention to the existence of another method of investigation of nature.²—Ed.

MIND IN NATURE

Theosophy

"The Universe is the expression of Life, Thought, Consciousness. These are the energizing, guiding Principle in all Cosmic Processes, whilst that which appears under the guise of Matter is the objective correlative of this primary activity of the One Life, or Be-ness".—(W. Kingsland, *The Physics of The Secret Doctrine*,³ p. 37.)

Science

The reduction of material things in terms of mind is now the theme of scientists as it has been that of philosophers:

"From the intrinsic evidence of his creation, the Great Architect of the Universe now begins to appear as a pure mathematician".

"The universe can be best pictured as consisting of pure thought".

"If the universe is a universe of thought, then its creation must have been an act of thought".

¹ Introduction, p. 1.

² See the monograph on "Chemistry" and "A Note on Occult Chemistry", Part II of this series.—Ed.

³ H. P. Blavatsky, *The Secret Doctrine* was first published in 1888.

N.B.—All references to *The Secret Doctrine* are from the 3rd Edition.—Ed.

Theosophy

"Occultism sees in all these Forces and manifestations a ladder, the lower rungs of which belong to exoteric Physics, and the higher are traced to a living, intelligent, invisible Power, which is, as a rule, the unconcerned, but, exceptionally, the conscious, Cause of the sense-born phenomena designated as this or that natural law".—(S.D., I, 605.)

"... and between this time (1888, the date of the writing) and 1897 there will be a large rent made in the Veil of Nature, and materialistic Science will receive a death-blow".—(S.D., I, 671.)

"Mahat—Universal Intelligence, ... is no other than the Logos. ... He is, in short, the 'Creator', or the Divine Mind in creative operation, 'the Cause of all things'".—(S.D., I, 277.)

Science

"The universe shows evidence of a designing or controlling power that has something in common with our own individual minds".—(Sir James Jeans, *The Mysterious Universe*, 1934, pp. 124-37.)

"The cruder kind of materialism which sought to reduce everything in the universe, inorganic and organic, to a mechanism of fly-wheels or vortices or similar devices has disappeared altogether".—(Sir Arthur Eddington, *New Pathways in Science*, 1935, p. 323.)

"To put the conclusion crudely, the stuff of the world is the mind stuff".—(Sir Arthur Eddington, *The Nature of the Physical World*.)

"From 1895 onwards, there came *the new revelation in physics*. The new Physics may be said to have begun in 1895 with the discovery of X-rays by Prof. Wilhelm Konrad Rontgen of Munich. Rontgen's discovery led to another field of research, that of radioactivity. In this research, the first success fell to Henri Becquerel who in February 1896 found that uranium and all its compounds emit rays. The next year, 1897, was marked by the great discovery of ultra-atomic corpuscles. The new era in physics had begun. *The old materialism is dead*". (*History of Science*, Cambridge University Press, 1930, p.470.)

*Theosophy**Science*

It is "Psycho-Analysis" which has caused the greatest revolution in this field, and we are told that "the beginnings of psycho-analysis are marked by two dates: 1895 which saw the publication of Breuer and Freud's *Studien über Hysterie*, and 1900 which saw that of Freud's *Traumdeutung*."—(*Enc. Britt.*, vol. 18, p. 674.)

The Structure of the Atom.

"Until quite recently, atoms were regarded as the permanent bricks of which the whole universe was built. All the changes of the universe were supposed to amount to nothing more drastic than a re-arrangement of permanent indestructible atoms; like a child's box of bricks, these built many buildings in turn. The story of twentieth-century physics is primarily the story of the shattering of this concept".—(Sir James Jeans, *The Universe Around Us*, 1945, p. 111.)

"The units they (the physicists) have discovered will constitute not only a world of physics but, in the end and at far removes, also a world of life and spirit. . . .

"These units, particularly the electron and quantum, have an almost meta-physical aspect: they are physics infected with thought. . . .

"Thus it comes that the ultimate units are not purely physical or material but point to an undifferentiated

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primitive world-matrix which includes both the physical and thought-characters of the world".—(The Rt. Hon. General Smuts at a discussion on "The Evolution of the Universe," Brit. Assoc. 1931, quoted by E. L. Gardner, in *The Web of the Universe*, p. 38.)

UNITY OF NATURE

"Everything originated in the One, and, proceeding from the One, must finally return to the One".—(S.D., I, 620).

"The radical unity of the ultimate essence of each constituent part of compounds in Nature—from star to mineral atom, from the highest Dhyân Chohan to the smallest infusorium, in the fullest acceptation of the term, and whether applied to the spiritual, intellectual, or physical worlds—this unity is the one fundamental law in Occult Science".—(S.D., I, 145.)

"The belief—that all things are made of a single substance—is old as thought itself; but ours is the generation which, first of all in history, is able to receive the unity of Nature not as a baseless dogma or a hopeless aspiration but a principle of science based on proof as sharp and clear as anything which is known". —(Karl K. Darrow, *The Renaissance of Physics*, 1936, p. 301.)

Mie, one of the commentators of Einstein, says:

The recent developments of physics lead one to recognize everywhere in nature a principle of profound unity.

EVOLUTION

"Evolution according to Theosophy is that process of change whereby something that is latent and sleeping is brought into manifestation and activity. To understand this we must postulate two factors—

"What I find in evolution is *one great scheme from bottom to top, from first to last.*' What I also believe is that this advance throughout nature is a revelation of Divine Agency. And since mind at its best is the

Theosophy

a spirit or soul which is seeking expression, and a form or body wherein the spirit or soul expresses itself".—(H. T. Edge, *The Theosophical Path*, June 1932.)

Science

highest term in the course of evolutionary ascent it may well be said that the evolution of mind reveals the agency of mind".—(Prof. Lloyd Morgan in *The Great Design*, edited by Frances Mason, 1934, p. 132.)

"Now we are becoming convinced that by starting from the parts we shall never be able to explain organic and mental life, and that there is something like design in organic nature".—(Hans Driesch in *The Great Design*, edited by Frances Mason, 1934, p. 286.)

AN EVOLVING UNIVERSE¹

"How different all Nature appears when we come to know that even the 'dead' substances which compose our world are evolving . . . each element and its combinations are drawn upwards slowly, to become more perfect lenses of the Divinity dwelling within them".—(C. Jinajadasa, *First Principles of Theosophy*, 4th ed., p. 180.)

"*Light*—the first mentioned in *Genesis* . . . is the first begotten, and the first emanation of the Supreme, and *Light is Life*, says the evangelist. Both are electricity . . . From its swelling, electric bosom, springs *matter and spirit*. Within its beams lie the beginnings of all physical and

"There are authorities who maintain that already the evidence of inorganic evolution is convincing enough. The heavier atoms would appear to behave as though they were evolved from the lighter."—(J. Arthur Thomson, *Outline of Science*, Art. "Foundations of the Universe", 1922.)

The Cosmic Rays of Millikan "may be evidences of the actual birth of atoms of matter out of the fundamental particles of electricity in the outer reaches of our universe".—(Bazzoni, *Kernels of the Universe*, p. 177.)

¹ By courtesy of the Editor, *The Theosophist*.

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chemical action, and of all cosmic and spiritual phenomena".—(H. P. Blavatsky, *Isis Unveiled*, 1877, 1, 258.)

"Among many other objections to the doctrine of an endless evolution and involution, or reabsorption of the Kosmos, a process which, according to the Brāhmanical and Esoteric Doctrine, is without beginning or end, the Occultist is told that it cannot be, since 'by all the admissions of modern scientific philosophy it is a necessity of nature to run down' . . . To this we reply that nature runs down and disappears from the objective plane, only to re-emerge after a time of rest out of the subjective, and to re-ascend once more".—(S. D., I, 172-73.)

"The ancient philosophers, who saw in the Earth a huge 'animal', were wiser in their generation than our modern geologists are in theirs . . . This only shows how admirably Occult Philosophy fits every thing in Nature, and how much more logical are its tenets than the lifeless hypothetical speculations of Physical Science".—(S.D., I, 178.)

"It is difficult for the modern mind to imagine our Solar System as a living organism. Yet that is what it is".—(*First Principles of Theosophy*, p. 228.)

Science

It is more than probable that the transformation of matter into radiant energy "is also going on somewhere in the opposite sense, and that radiant energy is condensing back into mass".—(Millikan, *Evolution in Science and Religion*, p. 17.)

Radioactivity has changed the physical world "in our thinking overnight in its fundamental elements from a fixed, changeless static, dead thing to a changing, evolving, dynamic, living organism." —(Millikan, *Evolution in Science and Religion*, p. 46.)

Theosophy

"From whatever aspect we view and question matter, the world-old philosophy that it was vivified and fructified by the eternal idea, or imagination—the abstract outlining and preparing the model for the concrete form—is unavoidable. If we reject this doctrine, the theory of a cosmos evolving gradually out of its chaotic disorder becomes an absurdity; for it is highly unphilosophical to imagine inert matter, solely moved by blind force, undirected by intelligence, forming itself spontaneously into a universe of such admirable harmony".—*Isis Unveiled*, I, 396.)

Science

"We appear to be led to the assumption that the genetic or evolutionary processes, both cosmic and biological, when considered in certain aspects, constitute a simple orderly development that yields results not merely contingent, but resembling those which in human action we recognize as purpose."—(Henderson, Professor of Biological Chemistry, Harvard University, *The Fitness of the Environment*.)

The many unique chemical properties of the elements of our environment, all so remarkably adapted to sustain life, and "almost infinitely improbable as the result of contingency, can only be regarded . . . as a preparation for the evolutionary process".—(Henderson, *The Order of Nature*, p. 190.)

INTER-STELLAR SPACE!

"Inter-stellar space is filled with highly attenuated matter such as may be put in air vacuum tubes and which stretches from star to star."

"The system of the stars is floating in an ocean of space—not merely an ocean of ether, but an ocean that is so far material that one atom or thereabouts occurs in each cubic inch". (p. 67, "Stars and Atoms" by Sir Arthur Eddington,) Eddington goes on to say that one atom per cubic inch is really a very high vacuum, since in even the highest vacuum we

¹ By courtesy of the Editor, *The Theosophist*, from 1938 June Number.—Editor.

A perusal of this excellent Number is recommended as a study for further corroborations.—Ed.

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can produce in the laboratory, many millions of atoms are retained.

(p. 212, 1938 June *Theosophist*.)

SOLAR AND TERRESTRIAL MAGNETISM

"The sun is a huge magnet".

"Existence of strong magnetic poles above the surface of the earth, . . . one of which has a cycle of several hundred years".

(*The Mahatma Letters*)

The sun—a magnet and sunspots shown to be magnetic.

(Art. "Sun", *Enc. Brit.*, 1929.)

"It is practically certain that at least a substantial part of the regular diurnal changes in terrestrial magnetism is due to overhead electrical currents, and the association of each current with magnetic disturbances, and of both with aurora, points to the upper atmosphere as the ultimate seat of at least disturbance phenomena."

(Art. "Earth Currents", *Enc. Brit.*, 1929.)

"The earth's magnetic field also exhibits a cyclic variation with a period of several hundred years".

(Art. "Terrestrial Magnetism", *Enc. Brit.*, 1929.)

THE STRUCTURE OF THE SUN

"The constant fluctuation of the magnetic matter and its energy upon which also depends the variety and number of spots. During periods of magnetic inertia the spots disappear, or rather remain invisible".

(The Master K. H., 1882.)

Hale detected in 1931 two invisible spots by the aid of the Zeeman effect.

(*Modern Astronomy*, by H. Macpherson, pp. 36-38, quoted from p. 215, 1938 June *Theosophist*.)

Theosophy

"The sun we see is not at all the central planet of our little Universe, but only its veil or its *reflection* . . . a reflection of the real sun which is invisible, a reflection of the huge 'storehouse' of our system wherein *all* its forces are generated and preserved".

"The sun is neither a *solid* nor a *liquid*, nor yet a gaseous glow, but a gigantic ball of electro-magnetic Forces, the storehouse of universal *life* and *motion* from which the latter pulsate in all directions, feeding the smallest atom as the greatest genius with the same material unto the end of the *Maha Yug*".

"Minute particles like a dust cloud. . . it is this that we call 'magnetic Matter'."

(The Master K.H., 1882.)

Science

"Today it is believed that the sun is made up of radiation, *i.e.*, electro-magnetic waves, electrons, and matter in a state that Eddington has graphically described as 'smashed'".

"Until recently it was supposed that matter could exist only in three states—solid, liquid and gaseous. . . . But our exploration of the Sun's interior has shown that there is a fourth state, in which the atoms are broken up into their constituent particles; we may describe it as a state of 'powdered atoms'".

(Art. on "Cosmical Physics" by Sir James Jeans in the composite volume, *The March of Science*, 1931-35.)

ASTRONOMY

"The Pleiades (Alcyone, especially) are thus considered, even in Astronomy, as the central point around which *our universe of fixed stars revolves*, the focus from which, and into which, the Divine Breath, Motion, works incessantly during the Manvantra".

"... the Pleiades are the central group of the system of sidereal symbology. They are situated in the neck of the constellation Taurus, regarded by Mädler and others,

"A 100 years ago the view was put forward by Mädler, perhaps on insufficient evidence, that the Pleiades lies at the centre of the Milky Way and that all the stars of the system revolve round that group as centre. Such a movement was considered doubtful but within the last 10 years the Rotation of the Galaxy has been accepted as a subject for precise research. . . . The centre of the system is in the direction towards the dense star clouds in

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in Astronomy, as the *central group* of the system of the Milky Way, and in the *Kabalah* and Eastern Esotericism, as the *sidereal septenate* born from the first manifested side of the upper triangle, the concealed Δ . This manifested side is Taurus... ", (S.D., II, 581-2.)

Science

Sagittarius". (Whitaker Almanac, 1946, p. 164.)

GEOLOGY

"This Era (the Cenozoic Era) corresponds to the period of Activity on the Earth in the Fourth Round and, as we have seen, *The Secret Doctrine* gives 43 million years for the average duration of this one world-period".

"It is interesting to note that the five Geologic periods included in the Cenozoic Era, correspond roughly to the periods of dominance of the five Root-Races spoken of in *The Secret Doctrine*".—(E. W. Preston, *The Earth and Its Cycles*, pp. 47-48.)

N.B.—The Cenozoic Era of the Scientists corresponds to the Fourth Round of *The Secret Doctrine*.

"The beginning of the new volume of the book of life, that in which we find man as we know him, took place about 50 million years ago, if we are to accept the average value given by various scientific authorities".

"The most important characteristic of the Cenozoic Era, as a whole, may be said to be the coming of the mammals and the development of the brain, culminating in man".—(E. W. Preston, *The Earth and Its Cycles*, pp. 47-48.)

THE TERRESTRIAL ORGANISM¹

"Our globe has its own special laboratory on the faraway outskirts of its atmosphere, crossing which, every Atom and molecule changes and differentiates from its primordial nature".—(S. D., I, p. 638.)

"Mesotrons are produced near the outer fringe of the earth's atmosphere, after the primary radiation coming from outer space has traversed a small but definite amount of matter".—(Thomas H. Osgood, *Jour. Applied Physics* 12, 92, Feb. 1941).

¹ By courtesy of the Editor, *Main Currents in Modern Thought*, May 1941, p.13.

*Theosophy**Science*THE ORIGIN OF THE EARTH¹

"The Occult Doctrine rejects the hypothesis born of the Nebular Theory, that the (seven) great planets have evolved from the Sun's central mass . . . Our Sun merely detached itself earlier than all the others, as the rotating mass contracted".—(S. D., I, p. 127.)

"The planets were not detached from the Sun. The sun and the planets are only co-uterine brothers, having the same nebular origin."—(S. D., I, p. 644.)

". . . Because of the presence of light atoms such as lithium and beryllium on earth and their absence in the sun's interior, the matter which forms the earth has not been expelled from the sun or some star of similar composition. The earth, planets and sun may have been formed at some early epoch out of similar material and this idea fits in with Lemaitre's expanding universe theory".—(H. N. Russel, *The Scientific American*, November, 1940.)

THE AGE OF THE EARTH

"Time from the beginning of Cosmic Evolution upto 1887, . . . 1,955, 884, 687 years".—(S. D., II, 72.)

[Roughly 2,000 million years.]

"If we wish to fix our thoughts on a round number, probably 2,000 million years—is the best to select".—(Sir James Jeans, *The Universe around Us*, pp. 148-152.)

"All the evidence is consistently in harmony with the conclusion of the last chapter that the Age of the Earth is between 1,600 and 3,000 million years".—(Prof. Arthur Holmes, *The Age of the Earth*, p. 77.)

SYMBOLISM

"From the very beginning of æons . . . the mysteries of Nature

"We did not consciously set out to construct a geometrical theory

¹ By courtesy of the Editor, *Main Currents in Modern Thought*, May 1941, p. 13.

Theosophy

... were recorded by the pupils of those same, now invisible, 'Heavenly Men', (Adepts) in geometrical figures and symbols. The keys thereto passed from one generation of 'Wise Men' to another".—(S. D., I, 671.)

Science

of the world, we were seeking physical reality by approved methods and this is what has happened. As the geometry became more complex, the physics became simpler; until finally it almost appears that the physics has been absorbed into the geometry".—(Eddington, *Space, Time and Gravitation*, XII.)

PHYSICS (LIGHT ETC.)

"Matter is crystallized Light".—(S.D., I, 522.)

"The mineral—which is light itself, crystallized and immetallized".—(S.D., II, 179.)

"Electricity is 'immaterial', in the sense that its molecules are not subject to perception and experiment: yet it may be—and Occultism says it is—atomic; therefore it is matter".—(S.D., I, 136.)

"... the life impulse passed on from planet to planet in *rushes or gushes*; not by an even continuous flow".—(A. P. Sinnett, *Esoteric Buddhism*, 1884, p. 172.)

"Matter being nothing but a sort of congealed radiation".—(Sir James Jeans, *The Mysterious Universe*, 1930, p. 77.)

Modern Science says: Electricity, Light and all radiations are atomic.

It is now established that every atom is built up of protons and electrons which are electrically charged.

Planck devised a *Quantum Theory* (*Annalen der Physik*, Vol. IV, p. 553, 1901) according to which radiation (light, electricity, etc.) is not continuous but, like matter, can be dealt with only in individual units or atoms. Light, according to this theory, "seems to consist of a stream of minute *gushes* of energy which may almost be regarded as atoms of light". [Italics ours.—Ed.]

Theosophy

"To Occult Science, *force* and *matter* are only two sides of the same substance".—(S.D., I, 683.)

"For the Occultists it (light) is both Spirit and Matter. Behind the 'mode of motion', now regarded as 'the property of matter' and nothing more, they perceive the radiant Noumenon".—(S.D., I, 521).

"These beings (Angels) are the 'Sons of Light', because they emanate from, and are self-generated in, that infinite Ocean of Light, whose one pole is pure *Spirit* lost in the absoluteness of Non-Being, and the other Pole, the *Matter* in which it condenses, *crystallizing* into a more and more gross type as it descends into manifestation".—(S.D., I, 522.)

"To know what light is, and whether it is an actual substance or a mere undulation of the 'etherial medium', Science has first to learn what Matter, Atom, Ether, Force, are in reality".—(S.D., I, 523.)

"Light and heat are the ghost or shadow of Matter in motion".—(S.D., I, 561.)

Science

Light behaves sometimes like waves and sometimes like corpuscles (Undulatory and Corpuscular Theories of Light.) Electrons and protons have been found to behave in the same dual capacity.

What then is matter? . . . [it is] radiation—radiation imprisoned in electrical bonds. . . What is radiation? . . . Radiation is the fundamental stuff of which the universe is made. It is pure energy, so concentrated that it can act as a particle, and yet energy associated with vibrations or waves. It is the unity underlying the apparent diversity of the universe.

("Radiation"—*The Great Design*, 1934, edited by Frances Mason, pp. 59-60.)

THE NATURE OF MATTER

"All things are manifestations of the One Primordial Substance".

The view held by physicists in the latter part of the 19th century:

Theosophy

"Force, electricity, magnetism and matter are different aspects of the same thing".

"Electricity is matter".

"Matter a form of energy".

(*The Mahatma Letters. The Theosophist*, Sept. 1882, p. 319.)

"The *matter* of science may be for all objective purposes a 'dead and utterly-passive matter'; to the Occultist not an atom of it can be dead—'Life is ever present in it'." —(S.D., III, 399).

Science

"molecules—the foundation stones of the material universe—remain unbroken and unworn. They continue this day as they were created—perfect in number, and measure and weight".—(*Discourse on Molecules* by Clerk Maxwell, delivered in 1873 before the British Association.)

20th century:

Matter and energy (heat, light, sound, electricity, magnetism) are interconvertible.

The formula connecting matter and energy:

$$M \propto E/C^2$$

where M=Mass in grams,
E=Energy in ergs, and
C=Velocity of light.

Up to 1927 the physicists had found that the material forces of Nature were determinate and could be predicted. But now a particle behaves as if it were a living thing. It has a choice of its own which cannot be predicted. Electrons leap from one orbit to another as if they have a will of their own. No one can tell what an individual electron may be doing at any given moment.

Heisenberg's "Uncertainty Principle" or the "Principle of Indeterminacy" indicates that there is an uncertainty in the nature of things. Scientific determinism does not hold

Theosophy

"The physical Plane is a Plane of *effects*, not of causes; it is in fact a Plane many times removed from the Plane of Primal Cause, and the effects or phenomena discernible thereon are not primary, nor even secondary effects, but effects many times removed from the ultimate Cause or Noumenon".—(*The Physics of The Secret Doctrine*, p. 11).

"The relation of any Plane to the one next below it is a *force* relation; the higher Plane literally *ensouls* the lower".—(*The Physics of The Secret Doctrine*, p. 25.)

Science

in ultimate analysis, for both the velocity or momentum of a particle and its position cannot be determined with equal accuracy.

"The noumena immediately behind the physical phenomena may themselves be phenomena to noumena on a still higher plane, and so on up the scale. The physical plane is but the end-product of a long scale of differentiation, descending by degrees".—(Lowson, *Science and Reality*, 1936).

CHEMISTRY

"As the faculties of humanity are multiplied, so will the characteristics of matter be multiplied also . . . , the new characteristic (of matter), . . . let us call it 'Permeability', will correspond to the next sense of man, which we may call 'Normal Clairvoyance'".—(S. D., I, 272.)

Modern science is familiar with the penetrating power of Radioactive substances, for example, radium, uranium, etc.—(1896-1898.)

The discovery of X-rays by Röntgen in 1895.

THE CHEMICAL ELEMENTS¹

"It is a dogma of science . . . the allegation that the possibility of causing the atoms

¹ By courtesy of the Editor, *The Theosophist*.

Theosophy

Hermetists discovered the elixir of life, and that certain of them, by partaking of it, prolonged their existence far beyond the usual term, is a superstitious absurdity. And the claim that the baser metals have been transmuted into gold, and that the universal solvent was discovered, excites only contemptuous derision in a century which has crowned the edifice of philosophy with a cope-stone of protoplasm".—(*Isis Unveiled*, 1877, 1, 501.)

Science

of ordinary elements to absorb energy) are just, then the transmutation of the elements no longer appears an idle dream. The philosopher's stone will have been discovered, and it is not beyond the bounds of possibility that it may lead to that other goal of the philosophers of the dark ages—the *elixir vitae*!"—(Sir William Ramsay, *Harpers Magazine*, 1904.)

"Artificial transmutation of the elements was first accomplished by Cockcroft and Walton in 1932 . . . Some years earlier Rutherford had produced transmutations semi-artificially by using the high-speed particles emitted from radioactive substances".—(Sir Arthur Eddington, *New Pathways in Science*, 1935, p. 160.)

"One of the truest things ever said by a man of science is the remark made by Professor Cooke in his *New Chemistry*: "The history of Science shows that the age must be prepared before scientific truths can take root and grow. The barren premonitions of science have been barren because these seeds of truth fell upon unfruitful soil; and, as soon as the fullness of the time has come, the seed has taken root and the fruit has ripened.

"The revolution through which chemistry has recently passed, is

"... Modern ideas as to the genesis of the elements seem to reflect in an altered form, the speculative views of the Ancients."—(Sir William Tilden, *The Elements: Speculations as to Their Nature and Origin*.)

"What would the Alchemists of the Middle Ages say if they could return to their old habitation today and learn that actual transmutations do take place in nature?"—(Gibson, *Scientific Ideas of Today*, 1920.)

Theosophy

well calculated to concentrate the attention of chemists upon this fact; and it would not be strange, if, in less time than it has required to effect it, the claims of the alchemists would be examined with impartiality and studied from a rational point of view".—(*Isis Unveiled*, I, 163.)

"... Every year also, chemistry, beyond all the other sciences, approaches nearer and nearer the realm of the Occult in Nature. It is assimilating the very truths taught by the Occult Sciences for ages, but hitherto bitterly derided".—(S. D., 1888, I, 595.)

"Occultism says that in all cases Matter is the most active, when it appears inert. A wooden or a stone block is motionless and impenetrable to all intents and purposes. Nevertheless, and *de facto*, its particles are in ceaseless eternal vibration which is so rapid that to the physical eye the body seems absolutely devoid of motion; and the spatial distance between those particles in their vibratory motion is—considered from another plane of being and perception—as great as that which separates snow flakes or drops of rain. But to Physical Science this will be an absurdity".—(S. D., I, 553.)

Science

"The atoms of matter are vibrating or gyrating with extraordinary vigour. The piece of cold iron you hold in your hand, the bit of brick you pick up, or the penny you take from your pocket is a colossal reservoir of energy, since it consists of billions of moving atoms. . . . Each molecule of the air, which seems so still in the house on a summer's day is really travelling faster than a rifle bullet does at the beginning of its journey . . . Electrons are to be found everywhere, forming part of every atom. . . . These amazing particles may travel with the enormous velocity of from 10,000 to more than 100,000 miles a second . . . Even in the atoms of hydrogen at a temperature which we could produce in an electric furnace the electrons spin round at a rate of nearly a hundred billion revolutions a second! . . . In a little bubble of hydrogen gas no larger than that letter ("O") there are *billions* of atoms; and they are not packed together, but are circulating as freely as dancers in a ball-room"—(Professor J. Arthur Thomson, *The Outline of Science*, art. "Foundations of the Universe", pp. 177-199, 1922.)

Theosophy

"In the annexed plate three gases are shown in the gaseous and four etheric states; it will be observed that the structure of the ultimate physical atom is the same for all, and that the variety of the 'elements' is due to the variety of ways in which these ultimate physical atoms combine."—(Annie Besant, *The Ancient Wisdom*, 1897, 1918 reprint, p. 46.)

(ED. NOTE: The "ultimate physical atom" in Theosophical terminology is not the "atom" of physical science, but the final subdivision of the atom, and is analogous to the electron.)

Science

"Up to the point we have reached, then, we see what the new view of Matter is. Every atom of matter, of whatever kind throughout the whole universe, is built up of electrons in conjunction with a nucleus. From the smallest atom of all—the atom of hydrogen—which consists of one electron, rotating round a positively charged nucleus, to a heavy complicated atom, such as the atom of gold, constituted of many electrons and a complex nucleus, we have only to do with positive and negative units of electricity". —(Thomson, *ibid.*)

DISCOVERY OF NEW ELEMENTS

Isotopes were first discovered by Besant and Leadbeater in 1908. (*Occult Chemistry*, by Besant and Leadbeater, pp. 16-20.)

Meta-Neon was the first isotope to be recorded in 1908.¹

Discovery of:

Proto-Argon, in 1908. (A lighter form of Argon)

Meta-Argon, *Meta-Krypton*, *Meta-Xenon*, in 1908.

Isotopes were first discovered by F. W. Aston in 1912.—(*Encyclopaedia Britannica*)

Meta-Neon was discovered by F. W. Aston in 1912.

The name "Isotope" was given to such elements by Soddy.

Proto-Argon not yet confirmed by science.

Confirmed by Science subsequently as isotopes.

¹ All elements described in this column are either given in *Occult Chemistry*, by Annie Besant and C. W. Leadbeater or in *The Theosophist*. For further information on the subject see "A Note on Occult Chemistry", in Part II of this series.—Editor.

Theosophy

Kalon, a heavy gas in air, and *Meta-Kalon*, in 1908. (Zero Group).

Platinum B, now called *Canadium*, in 1908. It is not an isotope of Platinum but a distinct metal.

Three new elements in the 8th Group of elements called X, Y, Z, *Interperiodics*, occurring between the groups Ru, Rh, Pd, and Os, Ir, Pt, (*The Theosophist*, July 1908.)

Occultum, (At. Wt. 3 ($H=1$)). Discovered in 1895, described and illustrated in *The Theosophist* in 1908, labelled "Occultum" in 1909.

A New Element "85," described and illustrated in *The Theosophist*, November 1932.

Masurium recorded in 1909. At. No. 43. Described and illustrated in *The Theosophist*, October 1932.

Illinium, discovered in 1909. Occult investigators reported a second variety of the element of At. No. 61. (*The Theosophist*, 1909, July, p. 456.)

Science

Not yet discovered by science.

Not yet described in textbooks of Chemistry.

Isolated by some mineralogists and announced in the *Mineralogical Magazine* 16 and labelled "Canadium".

Not yet discovered by science.

Not yet discovered by science.

The *London Times* (7-7-1943) describes a new element of the same Atomic Number "85" and calls it *Anglo-Helvetium*.

Two new names are suggested for the element "85":—

(1) Astatine (At) and

(2) Francium (Fr)

(*Nature*, pp. 8 and 24, Vol. 159, No. 4027, 4-1-1947)

Masurium, discovered spectroscopically, confirmed by science in 1925. At. No. given as 43.

Illinium, (At. No. 61) was discovered spectroscopically by Prof. B. S. Hopkins of the University of Illinois, 1926. It is christened "Illinium" since its laboratory discovery, after the State of Illinois.

*Theosophy**Science*

Rhenium, (At. No. 75) discovered and recorded in 1919.—(P. 99, *The Theosophist*, Oct. 1932).

Rhenium, confirmed by science in 1925.

"87", recorded in 1909. Described and illustrated in *The Theosophist*, p. 99, October 1932.

"87", discovered spectroscopically in 1931. It is now proposed to call it "Francium" (p. 10, *Nature*, 4-1-1947.)

"91", described and illustrated in *The Theosophist*.—Its At. Wt. is given as 234.833 (H=1).

"91". It is called Proto-actinium.¹

Adyarium, a new element in the stratosphere, of At. Wt. 2 (H=1). Described in *The Theosophist* of December 1932.

Not yet discovered by science.

Tellurium: A second variety of this element of At. Wt. 123.5, discovered in 1909. (*The Theosophist*, June 1926, pp. 305-7.)

One of the istopes of Tellurium has At. Wt. 123.6. Mellor: *Modern Inorganic Chemistry*, 1941.

BIOLOGY²

An objective conception of the universe is inadequate.

The Universe is both subjective and objective.

The Universe is a field for the drama of both the evolution of forms and the unfolding of consciousness.

Theosophy regards the universe as a whole and visualizes the need to express evolution in a single science of life.

19th Century

The concept of the universe was objective—an "attempt to build up an entirely objective, rational and mechanistic picture to explain everything in terms that the human intellect could tabulate and comprehend". —(p. 251, 1938 June *Theosophist*).

"The visible concrete universe and all it contains is thought of as existing in its own right, and given

¹ See "A Note on Occult Chemistry", Part II.—Ed.

² See pp. 251-262, T., June 1938.

Theosophy

Manifestations of life include both manifestations of form and 'manifestations of the human spirit which we know as life or consciousness values'.

Science

the original simple forms—whose origin is either evaded or seen as the result of a fortuitous happening—all other forms are a "becoming" from these by virtue of the inherent properties and powers possessed by the matter itself".

20th Century

Vitalists like Sir Francis Young-husband, Prof. Lloyd Morgan, Field-Marshal Smuts and others "regard the universe as a whole—almost a growing organism—in which every part has its place and function inter-related and interdependent".

"The alternating, rhythmic beat of the universe, the expansion and contraction of the breath of Brahma".

"The evolving universe as a whole appears to have the characteristics of a living being, since it undergoes alternate periods of expansion and contraction, rhythmically changing in a manner that we are accustomed to associate with the behaviour of living organisms".—(p. 256, 1938 June *Theosophist*.)

"The universe may undergo alternate rhythmical periods of expansion and contraction, somewhat in the nature of the human heart and lungs".—(Prof. de Sitter of Leyden) (p. 256, 1938 June *Theosophist*).

GEOMETRIC PATTERNS¹

"The underlying substance of the the universe is of a three-dimensional mesh-like character".

—(Stanzas of Dzzyan, S. D.)

Recent trends of modern chemical research are continually affording evidence that "not only salts, but all mineral forms are based on

¹ See pp. 251-262, T., June 1938.

Theosophy

"This will form the lines of force upon which the mineral forms are formed",—(p. 258, 1938 June *Theosophist*).

Science

certain recurrent patterns, so that we find cubes, tetrads and octahedra as the basic three dimensional patterns of which solid matter is built up". —(p. 258, 1938 June *Theosophist*).

VARIATION AND HEREDITY¹

"Occult view sees the whole biological evolution as a mechanism of change by which vital living influences create forms suitable to express certain qualities, and sees modification in form as due to the changing needs of the living entity that has created the form".

—(p. 260, 1938 June *Theosophist*)

"Orthodox science is content to see the *explanation* of variation and heredity in the chromosomes and genes, and to see the sudden happening of mutations as due to a chance variation, possibly produced by the impact of a stray cosmic radiation upon the material of the nucleus. It has so far found no explanation for the fortuitous appearance of sudden mutations as a kind of spontaneous happening. . . . natural selection is the accepted mechanism of evolutionary change".

The following suggestion is in line with the occult theory:

"That the organism may itself be the real sponsor for its own fate and future, and sudden mutations may quite reasonably be explained as due to the organism striking out on determinate lines of its own. Experimental proof might be obtained to support this view".

(Editorial Note, *Nature*, September 1937.)

¹ See pp. 251-262, T., June 1938.

*Theosophy**Science*

PHYSIOLOGY

"Occultism . . . traces some of the most anthropoid species to the Third Race man of the early Atlantean Period".—(S. D., II, 195).

Researches on "blood-groupings":

Results obtained from the study of animals indicate that anthropoids alone show the human blood factors.

MYTHOLOGY

"This proves once more that, in order to be dealt with, with at least an approximate degree of justice, the so-called 'myths' have to be closely examined from all their aspects. In truth, *every one* of the seven keys has to be used in its right place and never mixed with the others—if we would unveil the entire cycle of mysteries".—(S. D., II, 544.)

"With the material now to our hand it is important that we fully employ every possible rational method of interpretation. The folly of adopting one key to open all mythological doors has been illustrated by the fate of such systems as attempted to interpret the nature of the Gods by theories of a 'disease of language' . . . Let no method, linguistic, solar, anthropological, dominate our conclusions but let none be absent from our counsels".—(Lewis Spence, *Introduction to Mythology*, 1921, p. 115.)

ANTHROPOLOGY

"Physical Humanity has existed upon the Earth for the last 18,000,000 years".—(S. D., II, 158.)

"Dr. W. K. Gregory made a family tree of man and ape On the Osborne scale of reckoning, he and I gave the human stem an antiquity of about 20,000,000 years".—(p. 20, *Man's Family Tree*, by Sir Arthur Keith.)

*Theosophy**Science**(Peru)*

The Peruvians' power of handling great masses of stone, their love of colour and their capacity to produce brilliant pigments by unknown means . . . Their civilization grew out of an impulse given in 19,400 B. C. from a still older one. It was still flourishing in 12,000 B. C.—(Besant and Leadbeater, *Man : Whence, How and Whither ; The Lives of Alcyone.*)

Archæologists brought the Peruvian civilization to light.

A. Hyatt Verill says : " The Astronomical observations of Prof. Rudolph Muller would seem to prove conclusively that the ruins of Tihna-naco are over 13,000 years of age ". . . The great stone blocks of the well-known cyclopean ruins of Tihna-naco were brought from many miles away and are of unknown origin. . . Pottery, beautifully modelled and of unique colouring, has been found.

" Brilliant greens, blues, yellows and reds have been applied with unknown pigments and methods of firing ". (Art. " Peru ", *Enc. Brit.*, 1929.)

(For other examples see the monograph on " Archæology ".)

SCIENCE, METAPHYSICS AND OCCULTISM

" To form a nucleus of the Universal Brotherhood of Humanity, without distinction of race, creed, sex, caste or colour ".

(The first of the three declared objects of the Theosophical Society, 1875.)

" Universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, language or religion ".

(Article 55, Clause C, Chapter IX of the Charter of the United Nations Organization, 1945.)

" Modern Science is every day drawn more into the maelstrom of Occultism ; unconsciously, no doubt, still very sensibly ".—(S.D., I, 149.)

" —the external world described in physics (E. & O. E.) really exists.

" One thing can perhaps usefully be added. I do not think that with

*Theosophy**Science*

any legitimate usage of the word it can be said that the external world of physics is the *only* world that really exists".—(Eddington, *New Pathways in Science*, 1935, p. 26.)

"The most interesting moral to be drawn from Dr. Dingle's article has nothing to do with his detailed criticisms of the theories of the 'Aristotelians'; but raises the matter of the curious relationship which at present subsists between metaphysics and science".—(*Nature*, 12-6-37, Prof. C. G. Darwin, F.R.S.)

(See also "Physical Science and Philosophy", *Nature*, 12-6-37, pp. 1000 to 1012).

THE CYCLIC LAW

"The principle under which the various races of man as they develop are controlled collectively by the cyclic law, however they may individually exercise the free will they unquestionably possess, is thus very plainly asserted".

(Sinnott: *Esoteric Buddhism*, p. 76.)

"Over the events of life we may have control, but none whatever over the law of its progress. There is a geometry that applies to nations an equation of their curve of advance. That no mortal man can touch".

(J. W. Draper: *History of the Intellectual Development of Europe*.)

D. D. KANGA

WHERE THEOSOPHY AND SCIENCE MEET

A STIMULUS TO MODERN THOUGHT

Vol. I

PART II: MAN

FROM ATOM TO MAN

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"We recognize but one law in the Universe, the law of harmony, of *perfect equilibrium*".

(*The Mahatma Letters*, XXII, p. 141.)

"The new God was the God of law and order, the new duty to know that order, and to get into harmony with it".

(MILLIKAN R.A., *Evolution in Science and Religion*, p. 80.)

INTRODUCTION

THE PRINCIPLE OF NON-ATTACHMENT

WE feel that it will be in the fitness of things if an attempt is made, at this stage in the development of the scheme given in the book, to enunciate a principle underlying the several monographs given there. We shall call this principle the Principle of Non-Attachment and illustrate it with a few homely examples. It will also give us a slight insight into the *modus operandi* of the principle and show how one can pass from **Intellect to Intuition**.

The Principle.—"To solve a problem pertaining to a particular plane, or sub-plane, one should rise to a plane higher than the one on which the problem is confronted".¹

Examples.—If you find yourself in a place where it is excessively hot in summer and cold in winter and you fume and fret about it and wonder how your body will be able to bear these extremes of temperature, you will be able to solve this problem affecting your body by going to a plane above that of the body, that is, from the physical plane to the mental plane. If you become absorbed in reading an interesting book or an intriguing novel or in exploring an intricate problem in your study room or laboratory, you will find from your personal experience, or you may have already noticed it, that you will forget altogether your body and the vagaries of weather or the extremes of temperature.²

Once again, if the problem is one of taking a big ship which has become stranded on the beach at low tide to the sea some distance away, would you try to solve the problem by tying a strong long rope to the ship, employing hundreds of men and with their help dragging it to the sea, an impossible feat, or by watching the ship get afloat by waiting for

¹ For the explanation of the terms plane and sub-plane, see the monograph on Chemistry, this Part.—Ed.

² Read the article on "The Thrill of Self-Exploration", Part III, this series.—Ed.

a few hours and allowing the waters of the tide flow along the shore and go under and around the ship? You may then put up the sails or run the engines and see the ship gliding along merrily on its voyage to its destination. What was supposed to be an impossible task on one plane, solid sub-plane in this case, became possible by working on a plane higher than the solid, namely, the liquid sub-plane, water. (Vide Diagrams 1, 2, 3.)

Let us take a third example to illustrate the same principle. If you are asked to make four equal equilateral triangles from six matches of equal length, you will not succeed in solving this problem even if you try it for months and years by attempting to arrange them in different ways on a flat plane—a surface having only length and width. But if you go to a third dimension and place the ends of the three matches respectively in the three angles of the equilateral triangle on the surface and bring the three other ends together at a point in the higher dimension, you will get a solid figure, a triangular pyramid, showing four equal equilateral triangles formed from six matches, as in *diagram 4*. Here again what was supposed to be a most difficult problem on a two-dimensional plane became solved in the twinkling of an eye by going to a higher dimension.

A Triangular
Pyramid

Take another example: If you are travelling in a train and look out through a window, say, one facing the east, you will see the scenery on that side only. Situated as you are in the train, it is physically impossible for you to see at the same time the scenery on the west, north or south sides. But if you, now, leave the train and traverse the same distance in an aeroplane, then you will get from that height a grand view in perspective showing the scenery on *all* sides at the *same* time, indicating how the different parts are connected together and form parts of one whole which seemed to be separate when seen from the ground level. (Diagram 4.)

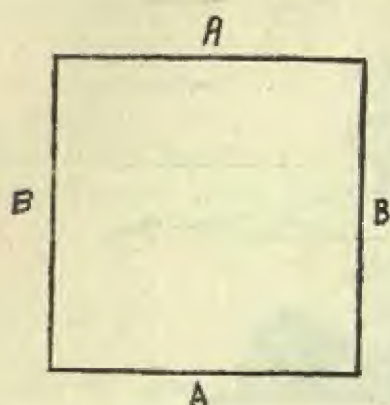
A View from the
Aeroplane

These different examples indicate that we are able to solve our problems, both personal and impersonal, simply because by seeing them from a height or a higher dimension or, in other words, from a higher level or greater depth in our consciousness we are able to take a wider and bigger view of the matter. This means that we become detached, not only from the problem itself under consideration, but also from our lower selves, our narrownesses and angularities, our biases and prejudices, our anger, fear, mistrust and suspicion, our selfishness, greed, hatred, cruelty, etc.

Getting detached
from our Narrow-
nesses



DIAGRAMS 1, 2, 3

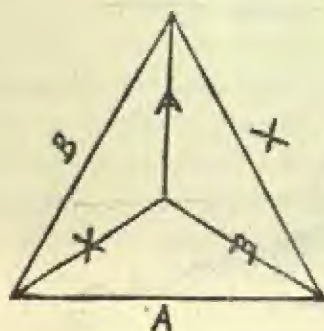


The Old Technique

Dual Concept

Partial View

Surface View



The New Technique of Intuition

Triune Concept

Whole View

Aeroplane View

A	.	.	.	.	Body
B	.	.	.	.	Mind
X	.	.	.	.	Spiritual Part

DIAGRAM 4

This is also psychologically true. When our consciousness is functioning on a higher plane we are able to see things in their proper perspective and trace varieties of connections which it is not possible for us to do when it is functioning on a lower plane. It is precisely for the same reason that we are not able to solve the complicated problems facing humanity for the last many years, such as poverty, hunger, disease, unemployment, wars, and other fundamental problems such as pain, fear, depression, loneliness, etc. Our failure is due to the fact that we are attempting to solve these

problems from the planes of body, lower emotions and mind.¹ To solve these problems, we must go to a region where our consciousness is functioning on higher levels (planes); this means that we shall make use of our spiritual part which will bring into function the activities of the higher (synthetic) mind, intuition and will. And when our consciousness is functioning on these higher planes, then spiritual qualities automatically manifest themselves in our character,² such as those of right thinking, broad-mindedness, large-heartedness, tolerance, amity and fellow-feeling, love and corporate activity, selflessness, tirelessness in work, self-sacrificing labour, self-imposed discipline, etc.

To summarize: Science, knowledge, brains alone cannot solve our problems; psychology, metaphysics, philosophy alone cannot solve our problems. What is wanted to solve our problems is a wise and balanced synthesis of all of them. Wholeness is Holiness, Nobility, Culture, Refinement.³

From Intellect to Intuition

But even this integration of thought will not help us to *experience* the unity of life, though it may give us an intellectual recognition of the fact that 'all life is one'.⁴ It is impossible to experience the unity of life through mind, for mind by its very nature even at its highest level is rooted in the idea of separateness, in the idea of Self and Not-Self. Therefore it was that H. P. Blavatsky has spoken of Mind as "the Slayer of the Real"⁵ if by Reality is meant the unity of life.

¹ See diagram 2, General Introduction, Vol. I.

² Vide the monograph, "The Joy of Self-Unfoldment", Part IV.

³ See Diagram 2, General Introduction, Vol. I.

⁴ Sir Jagadish Chunder Bose has shown this fact of the unity of life long ago by his classical researches given in (1) *Response in the Living and Non-Living* (1902); (2) *Plant Response* (1906); *Plant Autographs and their Revelations* (1927). Longmans.

Sir S. V. Ramamurthi brings in the aid of mathematics to prove the same fact in his thought-provoking paper on *One Self and one world*, read on 14-11-1948, at the Ranade Hall, Madras.

⁵ H. P. Blavatsky, *The Voice of the Silence*, p. 119, Golden Jubilee Edition, 1939.

Now the principal instrument of science is mind. The inductive method of science is purely mental. Any science however highly developed it may be cannot take us beyond the mental level. We shall now understand why it is necessary to become detached from the plane where mind is functioning and go to a plane higher than that of mind, which is the plane of intuition, if we desire to have an experience of the unity of life.¹

Our present-day education is more or less purely mental. This is excellent so far as it goes but it *it is not enough*. It is therefore necessary to *supplement* it, not to replace it, by another technique, which is the technique of intuition. The education for the New Age should be based on a new training and discipline based on this new technique which has for its aim the arousing of intuition. This we can do if our mind is pure, loving,² innocent, open and receptive to new ideas, unbiassed and unprejudiced, well-poised, passive and active at will, aware and perfectly under our control. The *modus operandi*³ to develop our intuition is ever to contemplate a Totality, not to think in terms of class or party but visualize everything as one whole, to develop tenderness and love for all, to remain in close touch with nature and hold communion with her, to do some kind of creative work and to have an appreciation of art and beauty.

D. D. KANGA

¹ See in this connection the sequence of phases of consciousness given by Marcault and Hawliczek in their classical book, *The Next Step in Evolution*, p. 6. See also pp. 140-141, Part I, this series, where the sequence of the same phases of consciousness is given to illustrate another point.

See also Introduction, Part IV, and p. 68, Part I, this series.—ED.

² For, 'love is the liberator of the mind', says a great sage.

³ C. Jinarajadasa, *The New Humanity of Intuition*, pp. 30-39, 1938.

⁴ See Diagram 4 above,

METHODS OF RESEARCH

By C. JINARĀJADĀSA

IT is a characteristic of the six systems of Indian philosophy that, before they expound their views, they first enunciate what are the criteria of proof which they admit as valid. Thus the philosophy of the Vedānta states as valid sources of information for judgment: 1. Pratyaksha, direct knowledge from contact of the senses or perception; 2. Anumāna, inference; 3. Upamāna, analogy or comparison; 4. Shabda, revelation or trustworthy authority; 5. An-upalabdhi or Abhāva-pratyaksha, non-perception or negative proof; 6. Arthāpatti, inference from circumstances.

Not all the six philosophies admit all these six criteria. The Nyāya school will admit only the first four. The Sāṅkhya will admit only the first, second and fourth, and will not admit analogy or comparison as a valid source.

The theological writers of Christianity placed revelation as the first criterion of truth, and added to it another criterion, which they created out of the philosophy of Aristotle. If Aristotle said so, it was truth.

It is interesting to note that Aristotle's philosophy is the result of a rebound from Plato, whose disciple he was for twenty years. Plato's system threw all its weight on the existence of "ideas", or archetypes as they were later termed. For Plato, investigation was a method of surveying the facts of existence in the light of predetermined principles. (This is the method of all Hindu philosophical systems.) Aristotle, however, saw no reason to accept the "ideas" of Plato, and preferred to start "from below" by gathering the material for truth by an examination of Nature as she is. His aim was to examine facts, and then draw inferences from them.

His principle was unquestionable, but as put by him into action, not sufficient facts were gathered before coming to generalizations. This was unavoidable, as the scientific spirit, as we know it today, had only just begun, and collectors of Nature's

facts were few and far between. However, in the Middle Ages, all that Aristotle taught was regarded as "gospel truth", so much so indeed that any dissent from his philosophy was considered a veritable form of heresy. To such an extent was Aristotle made the god of truth by medieval scholasticism that these Latin words were inscribed over the gates of one institution :

*Omnis hinc excluditur, omnis est abiectus,
Qui non Aristotelis venit armis tectus.*

Every one from here is barred, every one rejected,
Who comes not with Aristotle's armour protected.

The making of Aristotle into the absolute criterion of truth soon stifled all research. It is well known how the Ptolemaic system of astronomy long stood in the way of the establishment of a recognition of the true system propounded by Copernicus. The rigidity and narrowness of the Aristotelian approach to truth drew from Bruno, who rejected Ptolemy and accepted Copernicus, the scornful description that the Ptolemaic conception of the universe was *piccolo come il cervello d'un peripatetico*—"small like the brain of an Aristotelian".

It is from the break-away from the Aristotelian system as formulated in the Middle Ages that modern science was born.

Birth of Modern
Science

All admit that Francis Bacon was perhaps the greatest inspirer of the new era of thought. Even when Bacon had scarcely ceased from being a boy, he rebelled at the age of fourteen against the Aristotelian standpoint which he found in his university, and vowed to put an end to it.

Bacon's call was, "Back to facts, Back to Nature". This indeed was what Aristotle had originally in mind, but after his philosophy had become crystallized, his followers would admit no further facts which in any way challenged the system. Since the Master had formulated and systematized truth, it was useless to go to Nature in search of truth.

It is scarcely possible for us to realize today what a powerful

Bacon, Inspirer of
the New Era of
Thought

influence Bacon exercised over the minds of the men of his generation throughout Europe who were seeking truth. We have to admit that the method of induction which he propounded did not finally give the method needed by modern science. Whether this was due to the limitations of his method, or to a lack of true understanding of it, will be discussed later. But Bacon's

wonderful enthusiasm for research into Nature's facts, and his plans for experiments and for creating great museums, gave an impetus to the workers in Europe who were feeling after the experimental method. So great was the inspiration given by him to researchers in science that when the Royal Society was chartered in England in 1662, Bacon was accepted as the inspirer of the work to be done. In a picture composed by Evelyn, where King Charles II is proclaimed the patron of the Royal Society, we find a bust of the King on a pedestal, on his right a seated figure, with the title "President of the Society", but on his left is seated Bacon, with the designation *Artium Instaurator*, "restorer of knowledge".

Since the foundation of the Royal Society, the methods of research have slowly formulated themselves. The method recognized today as the only valid one is, first to gather facts and state them as clearly as possible, and in an impersonal manner, free from any bias to any preconceived views; and secondly, to form hypotheses concerning the facts, and to test each hypothesis by the facts. This is a method of trial and error; it is slow and tedious, but on the other hand, it has proved itself a valuable method for discovery. So much has been discovered by this method of induction of the laws of Nature that the trained scientist does not recognize any other method as allowable.

The Inductive
Method

A powerful challenge to this method of science was, however, made by Bergson. Bergson's challenge has not yet been met, and science is still proceeding on the old track. It is therefore necessary to understand what is the basis of his criticism. Bergson holds that intelligence, which is the sole instrument used for discovery in science, is inadequate, because it cannot give the *full* truth concerning Nature. Now, Nature is composed of inanimate and animate objects. The scientific method which uses intelligence alone is adequate for an understanding of inanimate objects, but not for that of animate objects.

Intelligence, says Bergson, treats all factors before it as if they were separate units, and as if each were divisible into finer and finer factors. Intelligence is excellent when it deals with inert solids: but when intelligence attempts to explain "life" and thought, which are not inert solids or divisible particles, then intelligence goes astray. For, intelligence tends to treat all things as if they were made of lifeless matter. The result is that intelligence sees

Intelligence cannot
understand "Life"

only a lifeless mechanism everywhere. Intelligence, by its very nature, cannot understand "life". It is therefore necessary that the intuition should fill in the gaps in understanding left by the mind. This is Bergson's proclamation.

Now, this intuition, says Bergson, is a sublimated form of instinct, which in the animal is a surer method of knowledge than that by mind. We all know how the instinct of the animal is wonderful. The carrier pigeon taken a hundred miles away from its home knows in which direction to fly. Eels which have grown to maturity in the rivers of Scandinavia, England and the Mediterranean know that, when it is time for them to mate, they must proceed to a particular region in the Atlantic Ocean, the Saragossa Sea, and they all migrate thither. In June 1935, a cat called Bonzo was taken in a basket in a motor car from Exmouth in England to Bodmin seventy-three miles away. She had never left her home before. Three days later she arrived home, "in splendid condition, pads quite sound, coat shiny, almost fat, and very happy to be back again". The cat had to come through a crowded city, Exeter, or to take a by-pass road which avoided the city, and to cross Bodmin moor, and go round the edge of Dartmoor. How did Bonzo know? By instinct.

We human beings have lost the faculty of instinct. We have developed intelligence, but sometimes we envy the animals their remarkable ability to know by instinct. Of course the development of mind in man, as he evolved from the animal, is an advance in evolution. But it is only a partial advance. That is Bergson's theme. The next advance for us is to develop the intuition.

Now, the intuition, Bergson holds, is allied to instinct; it is like some subtle and unawakened form of instinct. That is not my understanding of intuition, but that does not matter at the moment. So long as instinct is turned to action, says Bergson, as is the case with the animal, instinct is instinct, and nothing more. Man with his intelligence can often outwit the instinct of the animal. But instinct is based on life; it does not act mechanically, that is, as if it were a machine operated by the forces of matter, for instinct is alive. If, therefore, the instinct resident in man can be wound up like a spring, to go off towards knowledge, and not towards action, as in the animal, then his instinct can transform itself into intuition. When this transformation takes place, "Intuition leads us to the very

inwardness of life as successfully as intelligence guides us into the secrets of matter".

There are instances where a flash of intuition has revealed a scientific truth which no amount of mere intellectual cogitation gave. We know that Kekulé hit upon the configuration of the carbon atom as a tetrahedron from a flash of insight which he obtained as he watched the lighted street lamps. More significant still is the way that Robert Mayer discovered the Law of the Conservation of Energy. Heim stresses the fact that this truth was not the result of the inductive process of thought, but was due to some technique which was different from induction. Heim remarks that the Law

did not gradually detach itself by dint of revolving it in his mind, from the conceptions of power transmitted in the past, but belongs to those ideas that are intuitively conceived, which, originating in other spheres of a mental kind, surprise thought, as it were, compelling it to transfer its inherited notions conformably with those ideas. (*Energetics*.)

It is to be noted that Heim mentions "other spheres of a mental kind" which are different from those in which the ordinary process of induction works. More noteworthy still is the striking characteristic of intuition, which Heim describes as "surprising" thought, and bringing with it a power "compelling it to transfer its inherited notions conformably with those ideas".

The need of the scientist today, not to be bound rigidly by the Aristotelian method of limiting himself only to ascertained facts, has been demonstrated by the development of physics. The laws as to the proton, electron, neutron and meson, the quantum, Heisenberg's principle of indeterminacy, the expanding universe, and many other truths accepted

The Discovery of
Truth by a New
Method

by the physicist, are not completely based upon strictly ascertained facts of Nature; they are based largely upon the necessities of mathematical law required to explain the facts. This new method, which seems a reversal of the strictly scientific method, has lately been severely criticized, by Dr. Herbert Dingle. The valuable correspondence in *Nature*¹ which Dr. Dingle's onslaught on the physicists brought forth, shows very clearly that while his criticism is justified, nevertheless science cannot proceed further if it limits itself to induction from experiment. As a matter of

¹ *Nature*, 8-5-1937, p. 784. *Nature*, 12-6-1937, pp. 997-1,012. See also p. 3, Part I, this book.—ED.

fact, science has already launched out to discover truth by a new technique, in order to supplement the old technique of simple induction from observed facts.

We must now consider the technique proclaimed by Bacon. Bacon asserts that his is not the old method of induction, but something completely new, which he has not derived from any predecessor. But strange to say, his method has been rejected, perhaps largely because it was not understood. Had Bacon been expounding to the thinkers of India, they would have understood at once what was the technique which he was trying to explain. Bacon insists that "forms" should be understood, but he means by "form" far more what we might term the abstract nature of an object than its physical representation. By a process of elimination, this "form" was to be understood in certain simple categories. But these are not the usual categories, but what appertain to the realm of the "higher mental plane", to use Theosophical terminology. In other words, if the object or event to be examined can be seen, not in terms of its phenomenal manifestation but of its noumenal existence, then the higher mind is already on the threshold of truth.

Bacon insists that his method is for all minds, and that it is utterly sure in arriving at truth. But the criticism which has been laid against his method is that it has not helped modern science. But this criticism is, in my judgment, largely due to the fact that, for want of a proper terminology, which could be understood in his day, Bacon was unable to explain clearly this vision of the world from the "higher mental plane". His explanations, though clear to the Theosophist-trained mind, did not suggest to the mind of his readers what was the method which he was formulating.

One important contribution to the problem of truth by Theosophy is the recognition that Nature exists in a dual aspect. She exists here below as the vast congeries of facts and events which the mind can tabulate. The mind that sees this, however, is what the Theosophist terms "the lower mind"; it deals with particulars first, and is characterized by the attributes of intelligence which is stressed by science. On the other hand, since man has a "higher mind", which can dissociate itself from his character as an individual in a particular race, or as either man or woman, that higher mind of man can see Nature in her essential characteristics, apart from time and space and the flux of events.

The Method of
Francis Bacon

Nature exists in a
Dual Aspect

One striking thought in Bacon is that in some mysterious manner the human mind has a quality in it so that it can awaken to the truth, which is outside that mind, by a subtle response *from within the mind*. There is, according to him, no need for a strenuous effort of trial and error, because the moment the true facts have been discovered, truth will spring up instantaneously before the observer.

Far away as Bacon may seem today, yet we have come in a round-
 Nature, Expression about fashion to what he proclaimed. In these days, as
 of a Mathematical the result of researches in physics, the scientist is begin-
 Mind ning to realize that all Nature is the expression of a
 mathematical mind. Now, the principles of mathematical structure of the
 universe must be everywhere, in every cell of our brains. The Grand
 Geometrician has not only stamped his signature on the universe as a
 whole, but also on every particle of matter which composes our body.
 Our natures are, therefore, inseparable from the fundamental truths con-
 cerning the universe. Since the universe is a totality, and since truth in
 its fullest sense is one whole, the nature of that whole must be impregnating
 us all the time. Just as, from one point of a continent of land it is possible
 to travel along its margin and know the whole continent, so by the thought
 of each individual it is possible to know the mathematical mind of the
 Demiurge. We can therefore understand Bacon's standpoint that, if the
 thing is seen in its essential categories, then truth is discovered at once.

The recognition of the intuition as an instrument for the discovery
 of truth is becoming more and more urgent. Spinoza
 Intelligence and pointed out that when the whole of any subject, viz.,
 Intuition all its essential factors, are presented before the mind,
 intuition manifests and reveals truth, that is to say, it will show the
 facts not in terms of discrete particles or solids, but in terms of "life",
 to use Bergson's terms. This mysterious faculty of the intuition has not
 yet been properly analyzed, for sufficient facts have not been gathered
 regarding its operation. The Theosophical approach to truth proclaims
 that, while the method of intelligence is absolutely necessary, yet the
 report of intelligence must be supplemented by the report of intuition.

I mentioned in the beginning that Sanskrit philosophies state at the
 commencement of their exposition what are the Pramāṇas
 The Sāṅkhya or kinds of valid evidence which they admit for the
 System purpose of their discussions. I stated that in the
 Sāṅkhya system only the following were admitted, (1) direct knowledge

or contact of the senses; (2) inference; (3) revelation, or trustworthy authority. It is, however, interesting to note that the intuition is recognized as a source of evidence, but under the strict limitation that it can be exercised only by superior beings, and not by ordinary humanity. The author of the work *Sāṅkhya Kārikā* is Ishvara Krishna. His fourth aphorism enumerates the three Pramāṇas mentioned above. In the Commentary on this aphorism by Vāchaspati Misra, the following striking statement is made: "The *intuition* or supernatural forms of Cognitions which appear in the great sages and adepts—though realities—do not in any way help the ordinary people, and as such are not treated of here".¹

It is important to note, with regard to the discovery of truth, that modern science has not fully lived up to her aims of the investigation of *all* Nature. She has circumscribed Nature to those aspects only which are observable by the five senses, and which can be tested by her present-day laboratory method. She has been strongly averse to the examination of problems of a psychic nature, because they will not conform to her laboratory technique.

The real Spirit
of Science

On the other hand, surely the real spirit of science is given in the words of Sir W. Thompson: "Science is under bonds, by the eternal principles of honour, to look fearlessly in the face of every problem that is presented to her". But she has not been fearless in the matter; she has lacked courage, after circumscribing the facts within a circle which she declared was the domain of science. It is only when science broadens her method, and invents the necessary technique of investigation, that she will be able to reveal as a part of science the truths which are now being discussed by Theosophists and Spiritualists concerning clairvoyant faculties, and the control of superphysical powers by the disembodied.

A Rigid
Standard of Truth
necessary

The contributions to science by clairvoyance must of course be like the contributions of any other research work in science. The handicap to the clairvoyant method today is that it is comparatively new, and most clairvoyants are utterly untrained both in observation and in correct reporting. From the days of the establishment of the Royal Society, a rigid standard of truth, both of observation and expression, has been developed, and is taught now in every university. Some day in the future, the same rigid standard of observation and report

¹ *Tattva Kaumudi*, translated by Ganganatha Jha (Poona, 1934).

will be exacted from all those who claim to possess psychic faculties. Science then will add another wing to her wonderful Palace of Truth. It is towards that era that the Theosophists are working.

One vital defect in modern scientific research is that it is fractionated. A writer in 1913 well described the situation. Modern Scientific Research is Fractionated "Chemists ignore the aether; mathematicians may ignore experimental difficulties; physicists ignore and exclude live things; biologists exclude mind and design; psychologists may ignore human origin and human destiny; folklore students and comparative mythologists need not trouble about what modicum of truth there may be in the legends they are collecting and systematizing; and microscopists may ignore the stars".

The whole question of truth needs to be seen from a new angle. Truth is Dynamic For truth is not a mere abstraction, something static, but a creative energy. When we use the term "evolution", we mean a certain process of the past and the present, but there is not usually attached to it a clearly formulated thought that evolution is not a theory but an *action*. T. H. Huxley in his *Essays upon some Controverted Questions* well said in 1854: "It is very desirable to remember that evolution is not an explanation of the cosmic process, but merely a generalized statement of the method and results of that process". Every particle of dust and each cell in the self of man is continually changing. The report, therefore, concerning the universe as it was yesterday is not the full truth concerning it as it is today. A little glimpse of the doctrine that "everything flows" of Heraclitus "everything flows" appears in Heisenberg's principle of indeterminacy. This principle has, to the Theosophist, a strange addition that, since the universe is so living, the thought of each particle influences every other particle. Thus when an observer looks at the atom, touching it with his thought as he observes it, he modifies to some extent that atom's nature. So that the next instant when he observes the atom, it is not the *same* atom in every respect, as it was the instant before. It is this living quality of the universe as a whole which is one of the great truths proclaimed in Theosophy.

Already science has realized the unity of the universe, for, says The Unity of the Universe Professor Milne: "All the matter of the universe . . . must necessarily be taken into account in describing the motion even of a particle". When science some day will state that

a unit of *life* goes with each particle as does an electric charge, science will have become Theosophy.

Science cannot be complete science until *all* aspects of the cosmic process are surveyed. Now, there is one aspect in the Nature as Beauty¹ cosmic process to which scientists are completely blind.

It is Nature as Beauty. Every botanist can see a geometrical design everywhere. In the number of petals of a flower there is symmetry and geometrical design; the spiral curve is seen in the way a pine branches out its branches from stem to the newest branch. The logarithmic curve is seen, when the chambered *nautilus pompilius* is sawn in two, as the basis of its growth. Birds and fishes are coloured as if by a creative artist working in a studio and revelling in his artistic phantasies which produce in us a sense of amazement and rapture. It may be said that it is not the role of the scientist to respond to beauty nor explain its genesis. But can that be real and complete Science which ignores Nature in any single aspect of her revelations? Complete science has not yet been born.

The methods, then, of science must never be rigid. Science must be ready continually to create a new technique, as new spheres of the universe unroll before her gaze.

Group after group of scientists have held forth from the professor's place in the lecture theatre. It was the turn of the geologists and palæontologists first, Lyell, Owen and others. Then the biologists had their turn, Darwin, Wallace, Huxley, Haeckel. For a while, the aether protagonists, O. Reynolds, Kelvin, Lodge, Poincaré, were the leaders. Then came the biologists again, Mendel, Bateson, de Vries, Morgan. The last group are the physicists—Einstein, Planck, Thompson, Eddington, Rutherford, Jeans, Dirac, de Sitter, Heisenberg. No longer are the proclamations only in the lecture theatre; they are now in vast public theatres, with the late Jeans as the most popular synthesist.

What group will next "take the field"? Already some scientists have turned to poetry. In 1853, Clerk Maxwell wrote a noble hymn; Ronald Ross was a poet; Crookes had always the artist's touch in his exposition. As little by little, the sense of wonder increases in the

¹ Read in this connection Ch. XII, on "Nature's Message of Beauty" in *First Principles of Theosophy* by the author of this article where the subject is elaborated with a number of illustrations.—ED.

scientist's mind, new values will be seen in Nature. The creative beauty of Nature's hand will then be recognized as much a "cosmological constant" as mass or the quantum.

All that has been achieved by science today is only a fragment of the achievement awaiting her, when she adds to her technique of intelligence the next technique of the intuition. The intuition reveals the universe not as a dead mechanism, but as a bud growing into a flower

The Universe
is a Bud growing
into a Flower

which reveals new wisdom and beauty. For, behind all the processes of the universe, is a Grand Geometrician who, in the words of Dante, "moves the sun and all the stars". It is the firm conviction of the Theosophist dedicated to Science that a day will come when, to quote Goethe's words in *Faust*, Nature will reveal :

"Thus at the roaring loom of Time I ply,
And weave for God the garment thou see'st Him by".

RELATIVITY

BY SHYAMA CHARAN

ब्रह्म सत्यं जगन्मिथ्या, जीवो ब्रह्मैव नापरः ।

"BRAHMAN IS REAL, THE WORLD IS ILLUSION,
AND JIVĀ IS BRAHMAN, AND NAUGHT ELSE".

The ideal aim of Science is to give a complete mathematical description of phenomena in terms of the fewest principles and entities.¹

An unbiassed survey of the present state of nuclear Physics reveals that we are only at the beginning of things . . . I am convinced that the dual conception of matter, as particles which act on one another by means of the electro-magnetic field, cannot be final. Particles and field must form a higher unity ; they must be much more intimately related to one another than is assumed in the wave-mechanics.

The riddle of matter is still unsolved, but it is reduced to the problem of the Ultimate Particles. The solution of this problem is the task of the Physics of the future.²

"GOD said, Let there be Light, and there was Light". For ever so long scientists, ignoring God, have been trying to fathom the mystery of Light, and have never come to anything but contradictions in its nature.

The Mystery of
Light

Light is a phenomenon of the *Super-World* beyond the grasp of our physical senses and everyday consciousness. No *physical apparatus* yet devised by man has been adapted to delve into its nature.

Force—Light—Energy only remain at the end of the process of breaking up matter into smaller and smaller parts. Even these are nothing but the manifestations of Dynamic Energy (*Shakti*).

The Earth (nature) supported on Elephants (matter), the Elephants on a Tortoise (atoms—self-contained)—and then "remains the force"—*Shesha Nāga*, the eternal Serpent-Symbol of Force.

¹ Sullivan.

² Max Born, *The Restless Universe*.

Let us, in what follows, see how far our views regarding the latest developments in mathematics and physics on some such subjects as the Theory of Relativity, the Theories of our Universe and of the *Expanding Universe*, the Nature of Matter and of Light, the Principle of Uncertainty, etc., approach the theosophical viewpoint.

Generally speaking the outstanding advances in Physics in the twentieth century have been :

- (i) The resolution of atoms into ultimate particles of Positive and Negative Electrical Energy ;
- (ii) The Theory of Relativity ;
- (iii) The Theory of Quanta ;
- (iv) The Theory of Wave-Mechanics ;
- (v) Invasion of the domain of Physics by the Principle of Uncertainty ;
- (vi) Application of the Theory of Probability ; and
- (vii) Uncertainty as regards the nature of Light.

Perhaps it would be more correct to sum up that the chief event has been the surrender of the aggressive *certainty* of the nineteenth century scientists regarding the ultimate nature of things. Scientists now admit that they are still ignorant of it. They realize that their old *picturizations* of the Universe are still far from the truth.

Certainty of the
19th Century Scien-
tists giving way

Physicists are learning that the greater part of their observations are not observations of the events themselves, but of their effects which may be distorted by the intervening media. In his allegory of the cave, Plato warned us, more than 2,000 years ago, against fallacies of this kind.

Plato's Allegory
of Cave

When the scientists invent an atomic gymnasium and a system of electronic gymnastics, they know well that they are just speculating wildly. On the other hand, they know that the Mathematical Formulæ they have established, though uninterpretable (to our physical perceptions), are in *some* way representative of Reality.¹

THE THEORY OF RELATIVITY

Let us now see how science came to the Theory of Relativity.

The mass of a body appears in two distinct ways: (i) As the *Inertial Mass* of a body which appears in the Collision Experiments and

¹ Westaway.

(ii) as the *Gravitational Mass* which appears in the equation for attraction under Newton's famous Law of Gravitation, that each particle attracts another with a force which is directly proportional to their masses and inversely to the square of their distances from one another. Attraction between two particles of masses M and M' separated by a distance r , is given by GMM' / r^2 , where G is the constant of gravitation.

And we make the astonishing discovery that the relation between a body's Inertial and Gravitational masses is exactly the same as for any other body. This fact suggests the wild idea that the Inertial and Gravitational masses are one and the same thing. The idea is so wild that it seems to have occurred only to one man in the history of Science. As a result we have the tremendous scientific revolution called Einstein's Theory of Relativity.¹

Einstein's General Principle of Relativity gives the following Postulates :

Postulate 1. It is impossible to measure or detect unaccelerated translatory motion of a system through free space or through ether-like medium which might be assumed to pervade it.

Postulate 2. The velocity of light in free space is the same for all observers, irrespective of the relative velocity of the source of light and the observer.

From the second postulate it follows that addition, subtraction, etc., leave the velocity of light unaltered. Just as when we add or subtract a finite number from an infinite number, still infinity is left.

ॐ पूर्णमदः पूर्णमिदं पूर्णत्पूर्णमुदच्यते ।

पूर्णस्य पूर्णमादाय पूर्णमेवावशिष्यते ॥

"Om, that is *whole*, and this is *whole*,
The *whole* proceeds from the *whole*.
Taking *whole* from the *whole*, *whole* remains."

(Brihadaranyaka Upanishad)

The main consequences of the Theory of Relativity are :

(i) The Velocity of Light in free space is *constant* and is the maximum velocity ever attainable by anything.

(ii) The Mass of an object depends upon the ratio of its velocity to the velocity of light.

¹ Sullivan.

(iii) The Length of an object depends upon the ratio of its velocity to the velocity of light.

(iv) Space is curved; the force of Gravity has been replaced by the geometrical curvature of space.

(v) Light has also a mass, as the light-rays bend towards a mass when passing nearby the latter.

THEORIES OF OUR UNIVERSE

We shall now see what are the main theories regarding the nature of our Universe.

The three-dimensional space, (East-West, North-South and Up-Down) with which we are familiar, is either a property of the material world or a property of *our receptivity* of the material world. *Time* is the most formidable and difficult problem which confronts humanity.

Scientists have formed a *mathematical space* by welding together the usual three dimensions of space and *imaginary time* [i.e., $\sqrt{-1}$]. This space has peculiar properties imperceptible to our senses.

Light could be propagated in this peculiar space. But what is the *wave-carrying medium* in it, we do not know. The only thing we know about this medium is that, unlike material substances, it is not subject to gravity. *How* the transmission of electro-magnetic waves is effected, *we do not know*. What these *electro-magnetic waves* in the transmitting medium are like, *we do not know*.

Again, according to the new theories, the force of Gravity is not a Force, but Curvature of the peculiar Space that has been mathematically formulated by the scientists.

The Newtonian scheme says that a planet tends to move in a straight line, but the sun's gravity pulls it out of its straight course, and makes it describe a curved orbit. Einstein says that the planet tends to take the shortest route in his (Einstein's) universe which is full of *curves* and *bends*.

The Principle of Least Action¹ seems to endow even the inanimate particles with volition, so that out of the many possible paths they select and take the Least Path.

¹ The Principle of Least Action may mean either the *Shortest* or the *Longest Route*, as the mathematical principle from which it is derived only makes the first differential of the path zero.

Mathematically the universe has been reduced to a symbol: $qp-pq=ih/2\pi$, where $i = \sqrt{-1}$.

The equation conveys meaning only to the *Initiates* of the Physical Sciences, and it has as many meanings as there are physicists.

THE EXPANDING UNIVERSE

The main theories about the nature of our Universe are :

(i) Eddington's Expanding Universe, which doubles its radius every 1,500 million years.

(ii) Jean's Oscillating Universe,¹ expanding and contracting like a concertina.

(iii) Lemaitre's Explosion-Creation Universe : A handful (of God!) suddenly exploded and has been expanding ever since then.

(iv) Unstable Equilibrium Universe : Some *external* disturbance suddenly overturned the State Universe which was in unstable equilibrium—like a feather balanced on a circus joker's nose. Or it might be likened to a breathing movement into what was before unchanging.

Compare with this the view put forward in *The Secret Doctrine* :

The Eternal Parent, wrapped in her Ever-Invisible Robes had slumbered once again for Seven Eternities.

Darkness alone filled the Boundless All, for Father, Mother and Son were once more one, and the Son had not yet awakened for the new Wheel and his Pilgrimage thereon.

The Causes of Existence had been done away with ; the Visible that was, and the Invisible that is, rested in Eternal Non-Being—the One Being.

. . . The last Vibration of the Seventh Eternity thrills through Infinitude. The Mother swells, expanding from within without, like the Bud of the Lotus.

The Vibration sweeps along, touching with its swift Wing the whole Universe and the Germ that dwelleth in Darkness, the Darkness that breathes over the slumbering Waters of Life.²

In fact a new version of the old saying " God said, Let there be Light ", might be, " God said, Let there be *Movement* into the all-per-vading Quietness ".

Ether—Space—Our Universe, Finite, Expanding and Contracting, or Oscillating ! Admitted ; but into what and from what ?

¹ See p. 64, this Vol. also.—ED.

² *The Stanzas of Dryan*, I, 1, 5, 7 ; III, 1, 2.

By Space physicists do not mean mere Emptiness ; they refer to a medium having a *structure* of some kind, though the nature of this structure is unknown.¹ It may be said that the Space of the physicist is some medium that obeys certain mathematical laws. Einstein remarks in his book *The World As I See It* :

The ether of the general Theory of Relativity is a medium which is itself free from *all* mechanical and kinematic properties, but helps to determine mechanical and electro-magnetic relations.

Outside *his* mathematical universe a scientist has been forced to assume something into which *his* universe is expanding or oscillating. He calls this something a *Void* to differentiate it from the known Space which satisfies certain mathematical equations developed by him.

The view put forward by Madame Blavatsky in her momentous work *The Secret Doctrine* is worth noting :

It expands and contracts [exhalation and inhalation]. When it expands, the Mother diffuses and scatters ; when it contracts, the Mother draws back and ingathers. This produces the periods of Evolution and Dissolution, Manvantara and Pralaya.

The appearance and disappearance of Worlds is like a regular tidal ebb of flux and reflux.²

Maurice Maeterlinck comes very close to the Vedic view in his book, *The Supreme Law*, when he says :

We cannot in fact imagine the expansion of a Universe which has neither outline nor form, nor end, though we can conceive of a small Visible Universe, which recedes into the Great All, either because it would always transcend the range of our telescopes or because it is formed of substances or essences not visible to our eyes. It is therefore not the Universe which expands, but *one of its bubbles* which swells and gets displaced.

Does not all this represent a return to the great Vedic Hypotheses which are about a few hundred centuries old and according to which the Universe (*perceptible*) is only a dilatation, an exhalation, an emanation or an expiration of God who perpetuates Himself for billions of millennia and after which the bubble is deflated or bursts ; and there is once more an inhalation, contraction, reabsorption or return into God, who for other thousands of millennia, without destroying anything²—for everything is indestructible—renders imperceptible that which has been perceptible ?

¹ See Chemistry Monograph, Part II ; also diagram 6.—Ed.

² S.D., I, 40, 45.

Eternal does not mean immutable. Movement is the only life of eternity that our senses enable us to discover. How can we speak of dimensions when we are speaking of the Universe? Who says dimensions, says limits.

The misunderstandings are due to the imprecision of the word Universe; there are as many different universes as there are heads, . . . and no one has constantly present in his mind the image or the notion—which it is of course impossible to picture to oneself—of an Absolute Universe.

We assume too readily that the only possible Universe is the one we see, as though our eyes were the only testimony to all that exists. We only have confidence in that sense which deceives us more often than the others.

Even a very slight modification of the eyes would suffice to reveal by the side of or beyond all stars and all matter surrounding us, presences and energies as important and quite as real, of which we shall never have the faintest idea.

The physicists are on the border-line of what separates our universe of physical perceptions from *what is beyond* (the Absolute). The known laws of physics fail, our physical senses fail. Still the scientist is not yet ready to admit the existence of superphysical senses or Cosmic Consciousness to deal with the *real nature of the universe*.

The existence of many universes side by side, each being entirely unconscious of the existence of the others, is no bar to mathematical physics. The following is a very illuminating description on the independent existence of more than one universe interpenetrating one another. This view very closely approaches the theosophical viewpoint:

Interpenetration of
Universes

It is a relatively simple matter, without departing drastically from our customary methods of physical thought, to see how there could exist two universes, or for that matter an infinite number of universes, absolutely independent of one another, each populated by beings who occupied the same space, but who were absolutely unconscious of all universes but their own, and of all beings who occupied universes other than their own.¹

The mathematical physicist will realize that all that is necessary for the existence of the two universes of the kind in question, is that each should be specified by a set of quantities and equations in such a way that none of the vectors or scalars occurring in one set are to be found in the other.

Such a situation would result in each of the two universes being absolutely independent as regards all phenomena occurring in them, and would

¹ For a graphic representation of what is described here, see diagrams in the monograph on "Chemistry", this Part, particularly diagrams 4 and 5.—Ed.

carry with it, as a logical consequence, the absolute lack of consciousness of the beings in one as regards the activities which occurred in the other.

Again mathematical physicists will see how, starting with this complete independence, the scheme could be modified so as to invoke linkages between the two to any degree, by the inclusion in the equation, of quantities common to the two systems. It is even possible to provide, mathematically, for a meaning to the passage of a being from one universe to the other in such a way that in the old state he was quite unconscious of the state to come, and in the new state he is quite unconscious of the state from which he has departed.

In case the layman does not know what I am talking about, it may suffice to say that I am pointing out that mathematical physics presents no fundamental obstacle to his going to heaven.¹

THE NATURE OF MATTER²

How close modern science is gradually coming to the theosophical viewpoint as regards the nature of Matter will be seen from what follows :

Since according to our present-day notions the primary particles of matter are also, at bottom, nothing but condensations of the electro-magnetic field, our modern view of the universe recognizes two realities which are conceptually quite independent of each other, even though they may be causally connected, namely, the Gravitational Ether and Electro-magnetic Field, or as one might call them—Space and Matter.³

There have been several theories about the ultimate nature of matter :

(i) Descartes's hypothesis of continuous matter, and the consequent infinite sub-divisibility of matter.

(ii) Popular belief in Atomic Pellets, everlasting in form and infinitely hard.

(iii) Boscovitch's hypothesis that the atom is a centre of attractive forces at long distances, and repulsive forces at short distances.

(iv) Elastic-Solid-Ether hypothesis.

(v) Vortex-Ring hypothesis.

(vi) Vortex-Sponge hypothesis.

(vii) The Ether-Source theory of Karl Pearson—that the atoms are singular points through which ether (energy ?) is pouring in from the fourth and higher dimensions.

¹ W. F. G. Swann, *The Architecture of the Universe*.

² Read also the section on "The Nature of Matter" in the Chemistry monograph, this Part, along with this.—ED.

³ Einstein.

(viii) The Bubble theory—that the particles of matter are bubbles in ether, which is regarded as a very dense elastic solid. And finally,

(ix) The Electron hypothesis.

Modern physics is largely concerned with the structure of the atom.

The Atom is a
Hive of Activity

To the physicist the atom is a hive of activity; on the other hand, to the chemist it is a hard pellet which enters into chemical reactions as a whole unit.

The ultimate resolution of matter reveals the following constituents, all electric in their nature:

- (i) Electron—Mass almost 0, Charge -1 .
- (ii) Positron—Mass almost 0, Charge $+1$.
- (iii) Proton—Mass 1, Charge $+1$.
- (iv) Neutron—Mass 1, Charge 0.
- (v) Deuteron—nucleus of heavy Hydrogen.
- (vi) Neutrino—Mass smaller than the electron's and Charge 0.
- (vii) Alpha Particles—Mass 4, Charge $+2$.

Light has been also reduced to Photons, *i.e.*, particles of energy.

It is conjectured that the Cosmic Rays, the most penetrating and of the smallest wave-length, are generated when an electron meets a proton and the two combine together to neutralize each other and release energy. Some compare the Cosmic Rays to the Death-Rattle of matter, and others to the Birth-Cry of new atoms.

There is some doubt as to all of the above seven entities being separate. Some of them may just be combinations of the others. But *it is certain* that they are Dual Manifestations—Positive and Negative—of the same Electrical Energy. Thus the Building-Bricks of nature are the manifestations of *Ardha-nārīshvara*, *i.e.*, the Male-Female Deity, or the Positive-Negative aspects of the same.

Dirac has illustrated his theory of the positron by the idea of a Hole in an electron-packed universe. Such a Hole would have the properties of a positively charged particle. When an electron dropped into the Hole, it would combine with the positron. The particles would be annihilated, and be converted into two units of wave energy, or radiations.¹

Dirac's Idea of
Holes

¹ See also the *Physics* monograph, this part, on the subject.—ED.

² Crowther, *Soviet Science*.

And *The Secret Doctrine* says that "Fohat¹ digs Holes in Space".

Fohat digs Holes in Space When we have progressed so far, there is no reason to stop here :

Spirit (or Consciousness) and Matter are, however, to be regarded, not as independent realities, but as the two symbols or aspects of the Absolute, Parabrahman.²

In speaking of matter it is always necessary to remember that matter is not a substance, but a condition. Suppose for example that a man is blind. It is impossible to regard this blindness as a substance ; it is the condition of the existence of a given man. Matter is some sort of blindness.

PRINCIPLE OF UNCERTAINTY—DUAL NATURE

(i) The nature of Light depends upon the type of the experiment performed. When its *Photo-electric* effects are measured, it is revealed as granular in structure—Photon Particles.

On the other hand, when *Interference* phenomena are observed, it seems to behave as a Wave. The experimental results are such that our language is not expressive enough to formulate this *dual* nature into words. So Light can be a wave as well as a particle. Eddington has coined a new name for it—Wavicle.

No exact description of a Wavicle is possible. We may, if we please, look at this Wave-Point as giving birth to the electron as a Particle ; or again, if we please, look at the electron as a particle giving birth to a train of Waves.

There seems to be an *entity of some sort*, but it is *unknown*, and therefore neither describable nor definable. The physicists call this elusive entity in the waves as ψ (psi). To one physicist ψ is a singularity, to another a wave-function, to a third a field-symbol, to a fourth a probability, to a fifth an elementary indefinable. To the mathematician ψ is a thing of joy ; to the physicist a thing of terror.³

(ii) Electrons.—In Bohr's representation of the atom, the electrons are treated as definite particles circulating round the central positive charge in various orbits, which are mathematically determinable.

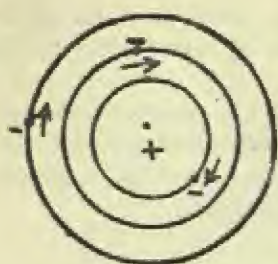
The Dual Behaviour
of Electrons

¹ Fohat is the energy of the Logos. See also the monograph on "Chemistry" this part, on the subject.—ED.

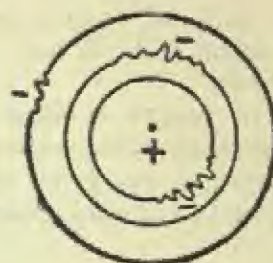
² S.D., I, 43.

³ Westaway.

On the other hand, according to the Wave-Mechanics the electrons are represented as packets of waves moving round the central positive charge.



Bohr's representation
of an Atom.



Wave-mechanics representation
of an Atom.

Heisenberg in 1927 showed that theoretically we can measure either the position or the velocity of any electron in its orbit, but that we cannot at the same time measure both the position and the velocity of any electron exactly.

We cannot realize perfectly Our World and the Super-World simultaneously. "Mirror of the soul cannot reflect both the Earth and Heaven; and the one vanishes from the surface as the other is glassed upon its depths".¹

(iii) The Quantum Theory of Energy.—Kinetic Energy, like mass, has Inertia, and that the Inertia of Matter is due solely to its internal energy is one of Einstein's most significant discoveries.

It has been found that Energy is not continuous, but that it has a granular structure like matter. Energy does not stream out in a continuous manner from its source, but in jumps, as if it consisted of discrete particles.

It is surmised that when an electron, out of the many circulating round a positive nucleus, leaves its orbit or jumps its orbit, and takes up another possible orbit round the same nucleus, a definite amount of energy, called a Quantum, is sent out into space. This is the least amount of energy available, or partaking in any action, and is equal to " $h \nu$ " where h is called Planck's Constant and ν the frequency of vibration; " $h \nu$ " also represents the energy of wavicle of light, and is known as a Photon or Light-Quantum.

¹ Lytton, *Zanoni*.

This unit of energy is very small as $h = 6.55 \times 10^{-27}$ ergs. To get an idea of the smallness of h , imagine a staircase to be constructed through a vertical height of 92 million miles, the distance from the Earth to the Sun, and let the vertical rise of each step be $1/10^{27}$ th of this distance, *i.e.*, let there be as many steps in this staircase as the denominator of h . Then there would be roughly a hundred billion steps to the inch. We may now be able to realize the smallness of the energy quantum—it is so small that the pulsations of energy may be regarded as almost continuous.

Now the *uncertainty* arises about the electrons which “jump their orbits”, to send out these quanta of energy. It cannot be determined with certainty *which electrons* out of the so many circulating round the positive centre, will jump their orbits. On the other hand, it can be calculated *statistically how many electrons* out of a given number will jump their orbits in a given time; just as it is possible to calculate *how many persons* are likely to die in a week in a certain country, but not at all possible to tell *which persons* are likely to die.

Here comes in the Principle of Uncertainty, which can be worked out only with the help of the Theory of Probability. Uncertainty has invaded modern physics to such an extent that it has been elevated to the rank of a Principle.

Until the statement of Heisenberg's Uncertainty Principle many, and perhaps the most, physicists believed that, if the position and velocity of each electron and proton in the universe were known, the position and velocity of each electron and proton at some future time could be predicted, although the mathematical processes needed to arrive at the prediction may be extremely difficult and tedious. Thus any future state of the universe was supposed to grow out of the present state of the universe.

Coming to human affairs . . . all human actions are controlled by the electronic and atomic configurations in the body, so that there is no room for Freedom of Will. Such freedom of will as is observed is only apparent and not real. When one acts in accordance with a wish, the wish is itself a result of material circumstances.

The uncertainty principle has changed the situation completely. According to Eddington and his school of thought, the uncertainty principle requires that a future state of the universe is not absolutely determined by its present state and that there is an inherent and natural uncertainty in all predictions of the future. Hence, this school argues, human actions may not be entirely determined by

Smallness of the
Energy Quantum

Heisenberg's
Principle of
Uncertainty

Principle of Uncertainty and Freedom of Will

the electronic and atomic configurations of the body, and if this is so, there may be room for absolute freedom of will within the bounds set by the uncertainty principle.¹

On the other hand, Einstein condemns as "objectionable nonsense" the attribution of anything like free will even to the routine processes of inorganic nature. He says that the indeterminism which belongs to the modern physics is a subjective indeterminism. It simply means that the physicist is unable to follow the course of the individual atoms and forecast their activities, and not that *those activities are undetermined*.

Einstein and
Freedom of Will

The writer personally believes that the freedom of will of human beings is like the length of a rope with which an animal is tethered to a peg. The animal has freedom within the circle of the rope. For some the rope may be short and for others long. So human destiny seems sometimes to be bounded by Karma, and sometimes it appears that there is some Free Will also. Who knows that ultimately this dual nature of human destiny, the problem of Fate-Free-will, may not be the two aspects of the same thing. Unless we are able to transcend the limitations of our space and time, we cannot arrive at a real solution of the problem.²

We do not know what is the nature of Light. We do not know what is the nature of Gravitation. We do not know what is the nature of Space-Time.

We now know after much scientific study and experiments, that *we know nothing*. The ignorant person knows *non-sensically* that *he knows nothing*. The learned person knows *sensibly* that *he also knows nothing*.

The outcome of
all is that We Know
Nothing

Maeterlinck in his book *The Supreme Law* says :

"Something is doing something we do not know what", writes Eddington. Is not this *nescio quid*, which is the last word of our science, but (a faint and vulgar echo of the magnificent) avowal of the Sāma Veda saying of the Supreme Deity :

"He who believes he knows it not, knows it; he who believes he knows it, knows it not at all. It is regarded as incomprehensible by those who know it most, and as perfectly known by those who are utterly ignorant of it".

¹ Jauncy, *Modern Physics*.

² See in this connection the monograph on *Chemistry*, this Part.—Ed.

The ultimate Scientific Reduction of Nature brings us down to Positive and Negative Manifestations of Electrical Energy—of *Shakti*; but nothing is said of *Chetanā-Shakti* or the Life Principle.

In the end we must not forget what Einstein, the exponent of modern Physical Theories, says :

The man who regards his own life and that of his fellow-beings as meaningless is not merely unfortunate but almost disqualified for life.

Schopenhauer's saying, "A man can do as he will, but *not will as he will*", has been an inspiration to me since my youth up.

The true value of a human being is determined primarily by the measure and the sense in which *he has attained to liberation from self*.¹

OM TAT SAT

NOTE

The writer is grateful to the authors and publishers from whose books he has quoted in this article and the following. He has slightly summarized some quotations. The long quotations have been taken from different places in the book, but put together as they express the same ideas. There is one quotation on p. 211 from an unknown author to whom he tenders his apologies. The conclusions have been collected from different sources as the aim of the two articles is to show how far and where Theosophy and Science meet in these two subjects.

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MODERN MATHEMATICAL THOUGHT

By SHYAMA CHARAN

Mathematics presents the highest certitudes known to the intellect, and is becoming more and more the final arbiter and interpreter in physics, chemistry and astronomy. Like Aaron's rod, it threatens to swallow all other knowledges as fast as they assume organized form. Mathematics has already taken possession of great provinces of logic and psychology—will it embrace ethics, religion and philosophy?—PHILIP HENRY WYNNE.

What is physical is subject to the laws of Mathematics, and what is spiritual to the laws of God, and the laws of Mathematics are but the expression of the thoughts of God.—THOMAS HILL.

Without Mathematics one cannot fathom the depths of Philosophy; without Philosophy one cannot fathom the depths of Mathematics; without the two one cannot fathom anything.—BORDAS-DESMOULINS.

Behind the artisan is the chemist, behind the chemist a physicist, and behind the physicist a mathematician.—F. W. WHITE.

PURE Mathematics is a collection of hypothetical, deductive theories built upon various foundations, each consisting of a definite system of primitive, *undefined* concepts or symbols, and primitive, *unproved* but self-consistent assumptions, commonly called Axioms, together with their logical deducible consequences following by rigidly deductive processes without appeal to intuition or experiment.

Pure Mathematics
Defined

Thus Mathematics, once fairly established on the foundations of a few axioms and definitions, *as upon a rock* (?) has grown from age to age, so as to become the *most solid fabric* (?) that human Imagination and Reason could boast of.

Once in his student days—walking with a great Hindu philosopher in his garden—the author was asked by the philosopher to explain to him the Theory of Relativity and the trend of modern mathematical thought. The student started off by saying that the structures built by the Philosophers without any

Mathematics and
Philosophy

tangible foundations and the structures built by the Mathematicians on firm foundations have both now become sky-scrapers. In fact the flights of imagination of the Mathematical-Physicist, when constructing a working model of the universe, exceed even the sublime heights reached by philosophical thought. However, after a brief but scathing cross-examination, the student had to admit that *Mathematics too has no firm foundations but is built upon the quicksand of postulates and axioms.*

PRACTICAL APPLICATION OF MATHEMATICS

Every common mechanic has something to say in his craft about good and evil, useful and useless, but these practical considerations never enter into the purview of the Mathematician.¹

Mathematicians never trouble about the utility of their science. They simply love to immerse themselves in working out elegant and logical deductions from a few self-consistent assumptions.

It is said that someone who had begun the study of geometry with Euclid himself, when he had learned the first proposition, asked the great man, "But what shall I get by learning these things"? Whereupon Euclid called his slave and said, "Give this man a couple of coins, since he must make gain out of what he learns".

A mathematician is not concerned with physical reality at all ; for no proposition whatsoever concerning the physical world can be proved by mathematical reasoning. It is the business of the mathematicians to supply the physicists with a collection of abstract schemes, from which the physicists are at liberty to take whatever fits in with their observations.

Each such abstract scheme is built upon a fundamental set of *assumptions*, called Axioms. A whole geometry could be constructed upon a few postulates, however absurd the latter might be. Granting *these postulates*, all the mathematical conclusions are logical. But the validity of the final structure is no greater and no less than *the validity of the primary assumptions.*

SYSTEMS OF GEOMETRIES

It is the glory of geometry that from so few principles fetched from without, it is able to accomplish so much.²

¹ Aristippus Cyrenaic.

² Isaac Newton.

The most suggestive and notable achievement of the nineteenth century is the discovery of non-Euclidean geometry.

A large number of different schemes of geometries have been constructed. Euclid based his system on the assumption that parallel straight lines do not meet however far they are produced. Modern mathematicians have evolved several different kinds of geometries—non-Euclidean—based on the assumption that the parallel lines *do meet at an infinite distance*. All these various systems of geometries are complete and equally valid. But each depends upon a fundamental set of *unproved axioms*.

Among the differences between these geometries, the sum of the angles of a triangle is exactly equal to two right angles according to Euclid, to less than two right angles according to the geometry of Lobatscheffski, and to more than two right angles according to Riemannian geometry.

It is the function of the physicist to find out which of the above systems of geometries applies to our universe.

Mathematics is not the discoverer of the *Laws*, for it is not induction; neither is it the framer of *Theories*, for it is not hypothesis; but it is the judge over both, and it is the arbiter to which each must refer its claims; and neither Law can rule nor Theory explain without the *sanction* of Mathematics.¹

In most sciences one generation tears down what another has built, and establishes an entirely new theory. In Mathematics alone, "which knows nothing of observation, nothing of experiment, nothing of induction, and nothing of causation", each generation builds a new story upon the old structure.

LOGIC OF THE INFINITE

In dealing with vast astronomical distances of the remotest nebulae, the velocity of light, etc., it has been found that the logic of finite numbers fails. The velocity of light has been found to be the maximum that can ever be attained. The velocity of the observer, or that of the light-giving source, produces no alteration in the measured velocity of light. Here additions and subtractions to the original number leave it unaltered. In dealing with the velocity of light and phenomena observed in the remotest nebulae it appears that the physicists have reached the confines of our universe,

¹ Benjamin Peirce.

where the laws and logic of our known world do not apply. New laws and hypotheses have to be evolved to fit in with the observations.

Ouspensky in his *Tertium Organum* says :

The mathematics of the *trans-infinite numbers* may serve as an example of "Real Mathematics", violating the fundamental axioms of our mathematics and logic.

By trans-infinite numbers, as their name implies, are meant numbers beyond infinity.

Infinity as is represented by the sign ∞ is the mathematical expression with which, as such, it is possible to perform all operations: divide, multiply, raise to powers. It is possible to raise infinity to the power infinity. This magnitude is an infinite number of times greater than infinity—it will be ∞^∞ . And at the same time they are both equal, $\infty = \infty^\infty$. And this is the most remarkable property of trans-infinite numbers.

You may perform with them any operations whatsoever, they will change in a corresponding manner, remaining at the same time equal. This violates the fundamental law of mathematics accepted for *finite* numbers. After a change, the finite number cannot be equal to itself. But here we see how, *changing*, the infinite number remains equal to itself.

The logic of trans-infinite numbers is :

- (1) A magnitude can be not equal to itself.
- (2) A part can be equal to the whole, or it can be greater than the whole.
- (3) One of two equal magnitudes can be infinitely greater than another.
- (4) All *different* magnitudes are equal among themselves.¹

Om Mani Padme Hum, the Sunrise comes !

The Dewdrop slips into the shining Sea !²

No, the shining Sea slips into the Dewdrop !

The Infinite is no more a quantity than Zero is a quantity. If Zero is a sign of vanished quantity, the Infinite is a sign of that *continuity of existence* which has been ideally divided into discrete parts in the affixing of Limits.³

Infinity is the land of mathematical hocus pocus. There Zero the magician is the King. When Zero divides any quantity, he changes it without regard to its magnitude into the infinitely great, and inversely, when divided by any number he begets the infinitely small. In this domain the circumference of the circle becomes a straight line, and then the circle can be squared. Here all ranks are abolished,

Happy is the King-
dom where Zero
Rules

¹ P. D. Ouspensky, *Tertium Organum*, p 259.

² Edwin Arnold.

³ G. H. Lewis.

for Zero reduces everything to the same level one way or another. Happy is the kingdom where Zero rules!¹

Here is an example of what happens when Zero is allowed to enter into a mathematical operation :

$$\begin{array}{ll} \text{Let } a=b, & \text{then } ab=a^2 \\ & \text{or } ab-b^2=a^2-b^2 \\ & \text{or } b(a-b)=(a+b)(a-b) \end{array}$$

Now dividing out by the common factor $(a-b)$, we obtain—

$$\begin{array}{l} b=a+b \\ =2b \end{array}$$

$$\text{Therefore, } 1=2 \quad !!!!!$$

This absurdity appears because we have divided both sides by Zero, i.e., $(a-b)$.

Numbers upon numbers pile,
Mountains millions high,
Time on time and world on world amass,
Then, if from the dreadful height, alas!
Dizzy-brained, I turn, Thee to behold,
All the power of number, increased thousand-fold,
Not yet may match Thy part,
Subtract what I will, wholly whole Thou art.

MODERN DEVELOPMENT IN MATHEMATICS

(1) *The Theory of Probability*

The chief developments in the domain of mathematics have been the evolution of various systems of non-Euclidean geometries of more dimensions than three. The theory of Probability, which began with considerations of the games of chance, has become the most important part of human knowledge, as it is now applied to all physical problems. There is no *certainty* in physics now. At best one can only calculate odds in favour of any event happening. The Uncertainty Principle has invaded and conquered the domain of Physical Sciences.

Dirac, one of the great exponents of Modern Physics, says :

When an observation is made on any atomic system—the result will not in general be determinate, i.e., if the experiment is repeated a number of times under identical conditions, several different results may be obtained.

¹ Paul Carus.

Instead of accuracy and precision, which up to now were ascribed, to nature, we have nothing but *uncertainty and randomness*. Nature does not follow the principles of what we call Simple Mathematics. At present the physicist is much occupied with the study of the Statistics of Electron Jumps. We can foretell what will happen in the *long run* when coins are thrown up, *i.e.*, whether on falling they will be *heads or tails*; and apparently physicists can quite as definitely forecast what will happen in the *long run* when they experiment with vast crowds of atoms and electrons. The Laws of Averages and Probability are entering more and more into the physics of very small (electronic) and very great (cosmic) things. The 2,000-year old theory of Causation again *seems* (?) to be in the melting pot. May it not be that the atoms and electrons which compose the crowd are not ultimates, that there are differences among them of an infinitesimal order, which cause differences in their behaviour? We have to resort to averages and probability because of our ignorance.

(2) *Wave-Mechanics*

Again, in modern physics, to reconcile the dual nature of light, the old Mechanics had to be replaced by Wave-Mechanics. All phenomena are now supposed to be due to Waves, either of energy or Uncertainty. The ancients were not far wrong when they referred to the *Music of the Spheres*. Music after all consists of harmonious waves whose various frequencies bear a certain ratio to one another.

The following table shows the range of wave-lengths from the highest to the lowest electro-magnetic manifestations of nature.

TYPE OF RADIATION ; WAVE-LENGTHS IN CENTIMETRES

Wireless	2,000,000 to 10
Heat	.03 to .00,008
Visible Light	.00,008 to .00,004
Ultra-Violet Light	.00,004 to .00,000,5
X-Rays	.00,000,1 to .00,000,000,8
γ -Rays (Break up of radioactive atoms)	.00,000,000,5 to .00,000,000,005
Cosmic Rays	.00,000,000,000,000,1 (?)

THE NATURE OF THE UNIVERSE

"So God created man in His own image". A man's imagination cannot picture more than what he is accustomed to seeing all round himself. *So man created God in his own image.*

In the pastoral state of civilization, God was the heavy-handed Patriarch of the tribe. He was prone to anger, full of revengeful spirit, and was pleased with gifts and flattery. Later, as man's *humanity* developed, He became more and more of the nature of a kind Father; and still later, He was an Abstraction of all virtues.

Then man took up the study of science, that is, the workings of nature. God at once was metamorphosed into an Engineer—a Mechanical Engineer. The scientist tried to make a mechanical working model of the universe. Still later, as man learnt to see the wonders and properties of electricity, God was assigned the honour of being a Super-Electrical Engineer.

Now, the universe has been reduced to symbols of Pure Mathematics, which convey nothing to the physical senses of man, and which are beyond our imagination in physical terms. *So God is now a Pure Mathematician who geometrizes.*

Bernard Shaw says in his book, *The Adventures of a Black Girl in Her Search for God*:

You cannot teach these people the truth about the universe. Ask that girl to divide a quantity by the *Square Root of Minus x* ($\sqrt{-x}$), and she will not have the faintest notion of what you mean. *Yet the division by the Square Root of Minus x is the key to the Universe.*

On the other hand, in the last century, Leibniz believed that he saw

the image of creation in his Binary Arithmetic in which he employed two characters only, i.e., the Unity and Zero. Since God may be represented by *Unity*, and Nothing by *Zero*, he imagined that the Supreme Being might have drawn all things from nothing, just as in the Binary Arithmetic all numbers are expressed by the union of *Zero with unity*.

Mathematics is a hard task-master. The student who wants to understand it has to undergo a rigid training extending over at least a score of years.

Once when lecturing to a class Lord Kelvin used the word "Mathematician", and then interrupting himself asked the class, "Do you know what a mathematician is?"

Then on the blackboard he wrote, $\int_{-\infty}^{+\infty} e^{-x^2} dx = \sqrt{\pi}$.

Pointing with his finger to what he had written, he turned to his class and said, "A mathematician is one to whom *That* is as obvious as that twice two makes four to you".¹

And we want to understand the nature of *That* immediately, without any preparation whatsoever, without devoting any time to make our physical senses capable of grasping the nature of *THAT*, which is beyond our logic and senses.

To an Adept the Esoteric Symbolism is as obvious as is the above formula to a mathematician, as obvious as that twice two makes four to anybody else.

RECENT ADVANCES IN MATHEMATICAL THOUGHT

- (1) Development of Non-Euclidean Geometries of *n*-dimensions.
- (2) Application of the Science of Probability to Physics.
- (3) Development of Wave-Mechanics.
- (4) Discovery of the failure of ordinary Mathematics when dealing with very small or very great quantities.

For BIBLIOGRAPHY, see the monograph on "Relativity".

¹ *Life of Lord Kelvin.*

PHYSICS (LIGHT, SOUND, ETC.)

By R. D. KANGA

"There can be no possible conflict between the teachings of Occult and so-called exact Science, wherever the conclusions of the latter are grounded on a substratum of unassailable fact. It is only when its more ardent exponents, over-stepping the limits of observed phenomena in order to penetrate into the arcana of Being, attempt to wrench the formation of Kosmos and its *living* Forces from Spirit, and to attribute all to blind Matter, that the Occultists claim the right of disputing and calling in question their theories. Science cannot, owing to the very nature of things, unveil the mystery of the Universe around us. Science can, it is true, collect, classify, and generalize upon phenomena; but the Occultist, arguing from admitted metaphysical data, declares

Inability of
Science to Fathom
the Reality

that the daring explorer, who would probe the inmost secrets of Nature, must transcend the narrow limitations of sense, and transfer his consciousness into the region of Nounena and the sphere of Primal Causes. To effect this, he must develop faculties which, save in a few rare and exceptional cases, are absolutely dormant, in the constitution of the off-shoots of our present Fifth Root-Race in Europe and America. He can in no other conceivable manner collect the facts on which to base his speculations".¹

WHAT was proclaimed by Theosophy years ago regarding the laws governing the physical universe, has now been passing true at the hands of modern physicists, and our task will be to show how far the New Physics is approaching Theosophy in its exposition of these laws, incidentally indicating the development of a plan which points to Law, Rhythm and Orderly Progression—a glorious ideal of perfection towards which everything in nature seems to be moving. Though modern science has achieved

Modern Science
and Ancient
Wisdom

so much, it is yet very far off from what has been achieved by the ancient wisdom. Some flashes of illumination have been caught by scientists, some glimpses of the Light beyond have been obtained, and it may not be long before a path is made which will take modern science a step nearer to the ultimate Reality, but that Reality can never be fathomed by them, unless and until they go beyond their senses and their instruments,

¹ S.D., I, 517-18.

however accurate and delicate they may be. Sir James Jeans rightly observes that "modern physics tries to discover the pattern of events which controls the phenomena we observe. But we can never know what this pattern means or how it originates; and even if some superior intelligence were to tell us, we should find the explanation unintelligible. Our studies can never put us into contact with reality and its true meaning and nature must be for ever hidden from us".¹

Until now the world thought was shut up within a frame represented by time and space, which were considered as absolute realities independent of the world that was contained within them. It has now been shown that time and space are not independent of matter but depend upon matter and energy which make up the world. Time, space, matter and energy

Matter and
Radiation

are now considered to be one united whole; matter is resolvable into energy; light, X-rays and other forms of radiation consist of energy-quanta or photons; matter is equivalent to radiation, thus giving new significance to the biblical statement, "Let there be light, and there was light"; matter and energy are different forms of one and the same thing; and matter in its ultimate analysis is that which is objective to mind—a conclusion arrived at years ago in *The Secret Doctrine*:

Matter, to the Occultist, it must be remembered, is that totality of existences in the Kosmos, which falls within any of the planes of possible perception.²

The new physics interprets the phenomena in a new way. It is not much concerned with the world of molecules, not even of atoms, but mostly with the world of sub-atoms, and it is this treatment of the sub-atomic world that reveals to them some outstanding features, most conspicuous of which being discontinuity and uncertainty.

These are some of the facts generally accepted by modern science, and we shall try to see the approach of the New Physics to Theosophy touching only a few salient points.

To begin with, it was Sir William Crookes—a Fellow of the Theosophical Society—who first put forward the question as to what would be the result if experiments connected with Electricity were made in a vacuum. The answering to this question has led to a profound discovery which has revolutionized the scientific world. The passage of

¹ Sir James Jeans, *Physics and Philosophy*, p. 16.

² S.D., I, 560.

electricity through gases at much reduced pressure soon led to the discovery of an emanation, a stream of something unknown proceeding from the negative pole of the current. This stream consisted of negatively electrified particles travelling at a portentous speed, which was measured and found to almost approximate the speed of light, *i.e.*, 186,000 miles a second. The size of these particles is so small that they are found to be smaller than the smallest atom known. The atom itself is so small that if hundreds of thousands were put in a row, they would not cover the diameter of a full-stop. But smaller than even those atoms are these negatively charged particles shot off from the negative pole. These negative charges of electricity are called Electrons. Physicists did not however take long to discover that the atoms of matter were somehow breaking up, and they saw in these tiny particles the ultimate constituents of matter. The older conception that the chemical atoms were the ultimate constituents of the universe was abandoned. Further investigation revealed another kind of particles called Protons to be co-existent with the Electrons in a discharge tube. Protons and electrons thus came to be recognized as the two final constituents of matter, out of which the universe was built. Thus in these new particles the physicists saw matter resolved into Electricity. This is certainly a very great step taken by the New Physics towards the physics of *The Secret Doctrine* of Madame Blavatsky.

Discovery of
Electrons

Solidity of Matter
—an Illusion

An atom is now said to resemble a solar system, with a nucleus charged with positive electricity, surrounded by a number of attendant electrons moving in concentric circles round the nucleus. This is a picture quite different from that of Newton's solid massive hard particles resembling tiny billiard balls. Between the nucleus and the surrounding electrons, it is all empty space. If, for instance, the actual protons and electrons that compose a man's body could be compressed together, they would amount to a scarcely visible speck. The solidity of matter is an illusion¹, like the *māyā* of the ancient Vedantic philosophy, the shadow on the wall of Plato's cave.

We have said that an atom is a miniature solar system. The nucleus of protons is the central sun, and the electrons are the planets revolving round this central sun in their orbits. But there is one notable peculiarity of this atomic astronomy, one in which it differs from celestial astronomy, which is so graphically

Atomic Astronomy²

¹ See also monograph on "Chemistry", this Part.—Ed.

described by Sir Oliver Lodge;¹ it is that the electrons while circling round the protons, have the power to drop from one orbit to another every now and again. It is as if Jupiter could suddenly drop to the orbit of Mars or Mars to that of Earth and begin circulating there, and it is this peculiar jumping behaviour of the electrons that is the cause of all Radiations, whether of light, ultra-violet rays, infra-red or wireless. We have been told that the speed of electrons in an atom is approximately that of light. In such a small space as occupied by an atom which is incredibly small, the very idea that electrons are approaching a speed of 186,000 miles a second staggers our imagination.

It is a well-known fact in science that a body in motion has a greater mass than when it is at rest. Also a body when it is electrified has a greater mass than when it is not. This high-speed electron therefore gathers mass by virtue of its motion. When it is stopped, the electron jumps from one orbit to another, and while jumping this additional gathered mass is thrown off as radiation.

All radiation is therefore produced by a sudden change in the motion of electrons, and the wave-length depends upon how fast the electron was moving and how quickly it was stopped.²

The kind of radiation they emit depends on how far they have jumped and where they jump. This jumping of electrons from one orbit to another is not a mere accident, a mere chance. In fact there is no such thing as chance in Nature.

Everything takes place under certain definite laws, e.g., the only circles that are possible in which the electrons are moving, are those that have the radii in the ratio of 4-9-16-25-36, etc., which are the series of square numbers.

We have been told that when the motion of electrons is suddenly stopped or disturbed, the extra mass or energy which they have gathered by virtue of their motion flies off and travels out in space as radiation. In accordance with the jumps these electrons take when they drop from one orbit to another, the radiation whether of light, heat, X-ray or wireless

is determined. In that way some 70 octaves of radiation have been observed. How limited is our sense of sight, and as a matter of fact are all our senses, that out of the 70 octaves, our eyes respond to barely one octave, that of light, though our ears respond to some eleven octaves of tone. As most people are

¹ Lodge, *Ether and Reality*, p. 139.

² *Ibid.*

aware, there is a whole band of invisible light, stretching beyond the violet end of the visible spectrum, called the ultra-violet, which shades into the very short waves called X and the cosmic rays, as also there is a whole band beyond the red end of the visible spectrum called the infra-red, which shades into what are called the long wireless waves. The difference between these is purely a matter of wave-length and rate of vibration. All radiations move with the speed of light, that is 186,000 miles a second. Nature manifests the beauty of its music in the vast gamut of these octaves, one end of which is that of gamma and cosmic rays whose wave-length is many million times smaller than that of light, while at the other end we have the radio waves measuring from a few inches to several thousand yards in length. They complete the gamut of Nature's Radiation. We live as if in a universe of radiation, and whether we sunbathe or clothe ourselves, we cannot escape the deluge of multifarious rays which wrap us round with an intimacy as close as life itself. Radiation is, as it were, the language of matter and energy; and the visible light-radiation which to us seems the main and most important part of Nature's speech, is only one-seventieth of its entire language.

The beauty of this Nature's music can be better appreciated when we study it somewhat in detail. If we examine the octave of the visible light-radiation, we find that it consists of seven colours—red, orange, yellow, green, blue, indigo and violet. By observation and experiment, it has been found that these colours go in pairs; thus red and green when brought together and seen through, obliterate each other and the white light only is seen, so is the case with orange and blue, and with yellow and indigo, and violet is left solitary. Their vibratory pulsations in inches are approximately as given below in round figures:¹

Red	Orange	Yellow	Green	Blue	Indigo	Violet
1	1	1	1	1	1	1
30,000	33,000	36,000	40,000	44,000	48,000	55,000

If we now examine their wave-lengths, we shall find that each pair is related as 3 : 4. Thus,

Red : Green :: 3 : 4

Orange : Blue :: 3 : 4

Yellow : Indigo :: 3 : 4

¹ E. L. Gardner, *The Fourth Creative Hierarchy*, Transaction of the Blavatsky Lodge of the Theosophical Society, London.

It is an interesting coincidence that all these pairs of opposites, of complementary colours which go to make white, stand in certain corresponding relation. Violet, though it appears solitary, has the wave-length of $\frac{1}{33.000}$ of an inch. It stands in relation with the orange and blue in the continuing ratio of 3 : 4 : 5, it being the synthesis of all. Strange to say that such a relationship is observed in all the octaves of radiations.

Let us now take another set of vibrations, *viz.*, the octaves of sound.

Our musical scale is a series of notes harmoniously rising in pitch from one octave to another. As each note is the result of vibratory pulses, obviously each note can be represented by a number which will determine its relation to any other note of the octave. This is represented as follows¹:

C	D	E	F	G	A	B	(C'8ve)
24	27	30	32	36	40	45	(48)

If we examine this octave, we find that it consists of three pairs, each pair being related as 3 : 4. Thus,

$$C : F :: 3 : 4$$

$$D : G :: 3 : 4$$

$$E : A :: 3 : 4$$

B stands in relation with the mean of these pairs in the continuing ratio of 3 : 4 : 5.

These are strange correspondences. It seems Nature wants to tell us something in these periodic pulses and in their corresponding relationship. One thing is obvious, that we find rhythm, harmony, law and order everywhere. The mystery involved in the Law of Periodicity and the Law of Correspondence makes a most impressive demonstration of a scheme of arrangement, of a Plan. No such scheme could be the result of mere chance, but points to law and harmony inherent in Nature and indicates orderly progression.²

If we examine this vast gamut of radiations, we shall find that each octave consists of three pairs of opposites, each pair consisting of, say, positive and negative, or male and female, or what is usually called in occultism Life and Form aspect. A student of Theosophy is well aware that the triangle (3) is the universal symbol of Life, whilst the square (4) is the universal symbol of Form. (See diagrams below.) Manifestation is due to the activity of the triangle, representing the positive

¹ S. D., III, 534.

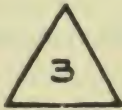
² For rhythms in Nature see the monograph on "Chemistry", this Part.—ED.

or Life aspect of the One, within the mother space representing the negative or female or Form aspect. Pythagoras represented the scheme of manifestation by numbers. The Pythagorean Three represents the Creative, Preservative and Destructive (or rather Transmuting) Principles of the One, whilst the Pythagorean Four, or Tetraktys, is the symbol of the Cosmos, as it contains within itself the point, the line, the superficies, the solid, in other words, the essentials of all forms.

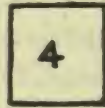
Matter is Crystallized
Light

In the eternal music of radiations, we find the summing up of the Manifested Universe, for what is the universe but the light radiation crystallized? *The Secret Doctrine* (I, 522) says that Matter is crystallized Light—a graphic and most illuminating description of a fundamental fact.¹

LIFE



FORM



SYNTHESIS



We have further seen above that the mean of the three pairs of opposites stands in relation with their synthesis in the ratio of 3 : 4 : 5. In accordance with the 47th problem of Euclid, which is said to have an intensely mystical significance, the square on the hypotenuse of a right-angled triangle is equal to the sum of the squares on the sides containing the right angle, that is, $3^2 + 4^2 = 5^2$. It means that Life + Form, the two being complementary, together make a unity. In masonic literature the Square is represented as the emblem

Occult Significance
of the Pythagorean
Proposition

of the lower nature or earthly existence of man, whilst the Compasses are as the Triangle which typifies the spiritual nature of man. When the lower nature is so subdued that the spiritual nature shines through it in all its magnificent glory, the man is said to have risen to his full stature of perfection, symbolized by a Five-pointed Star. He is now one with Life, for he has realized the Unity of Life in all the diversities of form.

Again in theosophical science, a vast scheme of evolutionary process is outlined in which the One becomes three and then seven, and the

¹ How very close to this is the description given by Sir James Jeans in 1930 (42 years later) in his book *The Mysterious Universe*, p. 77, when he speaks of matter as "nothing but a sort of congealed radiation".—ED.

results which follow are also based on septenary systems. We find the same process going on in these radiations. From the One that is the White which is supposed to be colourless, there proceed forth three fundamental primary colours, and the three by simple combination become seven.¹ And so also is the case with Sound. It is said that when a deep note, say, on a bell is struck, it is discovered that "at the same time as the original note is sounding, there are two other notes easily distinguished by a sensitive ear; these are called harmonics or overtones. These two notes, with the fundamental one, represent the primal Trinity of all things, and they form the first or common chord of music. Now, by the aid of musical instruments it is further discovered that other notes are also sounding, the seven notes of our musical scale".² From the one to the three and three to seven, seems to be the process running in Nature.

While investigating the sound-waves modern science has recently discovered waves of very high frequency, called the ultrasonic waves. The human ear cannot detect a pitch above 10,000 to 20,000 vibrations per second, but the ultrasonic waves have a frequency of over a million
Inaudible Sound per second. The effects of these waves are manifold and curious. They form the so-called death-rays which kill, especially the small insects and fishes through percussion. When these ultrasonic waves are passed through water, they make the water glow as if it were phosphorescent and they are also diffracted. Ordinary sound-waves cannot be given a directional effect except in such cases as whispering galleries, etc., but these ultrasonic waves can be given directional effect without the least trouble. Light, when it passes through water through which ultrasonic waves are traversing, is diffracted. These ultrasonic waves are generated by a vibrating quartz crystal.

It is said that the bats, by making use of these supersonics, avoid obstacles even when flying in total darkness. Experiments go to prove that they avoid obstacles not with the help of their eyes but of their ears. As a bat flies, it emits a series of very high-pitched cries—cries too high for most human ears to hear. As in Radar, radio-waves are set out and when they strike an object, an echo comes back and is shown up, on a special screen, and from the echo, the radio operator learns how far away the object is and other facts about it, so the sound waves set up from the flying bat, strike an

¹ See also *Chemistry* monograph, this Part.—ED.

² *Theosophy and Music*, by Norman Ingamells, (for many years the oboist in the Sydney Symphony Orchestra), T., Oct., 1946, p. 34.

object and an echo comes bounding back to the little creature and is picked up by its "microphone" (note the large ears and the conspicuous growths on the head) and a message is flashed to its wings, and in a moment the bat alters the direction of its flight and so avoids crashing against the object. In other words bats make use of the supersounds to feel the presence of an object in front of them.

As we have invisible colour so have we inaudible sound. Occult science says that "in the realm of hidden Forces, an *audible* sound is but a subjective colour; and a perceptible colour, but an *inaudible* sound."¹ Modern science has not yet clearly realized this fact. Though the above appears to be a paradoxical hypothesis, there are facts to prove it. In the cases of completely deaf persons, medical science has shown "that these sounds are received by, and conveyed to, the patient's organ of sight, through the mind, under the form of chromatic impressions".¹

As deaf persons are made to hear by means of colour impressions, so are blind persons made to read by means of a series of sounds. The invention consists of a small tube linked with a small box containing radio valves and batteries. The earphones are plugged into the box and as the tube is made to move along a line of print, a tiny spot of light illuminates the letters, whose patterns are reflected into the tube and are converted into a series of sounds, which, with practice, are as easily and quickly readable as Morse. When this device is made commercially successful, it is said that it may oust the Braille System.

Regarding this close relationship of sound and colour, occult science further says that "as a string vibrates and gives forth an audible note, so the nerves of the human body vibrate and thrill in correspondence with various emotions . . . thus producing undulations in the psychic Aura of the person which result in chromatic effects".² The human nervous system may be regarded as an Æolian Harp² which responds to the impacts of emotions and feelings, thus bringing forth the character of the

Human Æolian Harp person in colour phenomena, in the form of an aura seen by clairvoyants. This is indeed a very clever and intelligent explanation of the existence of auras. We

are glad to learn that research work in the study of the aura is now being done, under the direction of Mr. Fritz Kunz, by the Theosophical Research Seminars, New York, and some success has already been achieved. There

¹ S.D., III, 508.

² S.D., III, 509.

is nothing mysterious about it. As photographs can now be taken in a room which is pitch dark by means of infra-red vibrations, so the aura, which is said to be formed of subtler matter or waves, may be photographed by means of ultra-violet vibrations under suitable conditions.

A brilliant article has appeared in *Light* of 3rd December 1936, on "Making the Aura Visible", by a scientific investigator who claims to have made great developments on the old method of Dr. Walter Kilner's dicyanin screens. He says that there are seen two distinct auras—the inner and the outer—and they overlap each other for the first three inches.

Making the Aura
Visible

The inner aura clearly contains particles carrying a charge, since it is attracted by a magnet. The outer haze consists of rays of a wave-length between 400 and 300 millionths of a millimetre. "Temperature has no effect upon this haze; therefore, it is not a vapour. Dead tissue emits no aura, thus it is essentially a property of living organisms. The emission ceases at the moment the death takes place". This brings the aura definitely within the range of laboratory observation, thus confirming what had been told by the seers and occultists ages ago.

In Theosophy sound is said to have a more occult significance. Every sound in the visible world awakens its corresponding sound in the invisible realms and arouses to action some force or other on the occult side of Nature. Let us take music. "According to the Indian theory, particular notes have a peculiar quality or potentiality for interpreting and

Music and Emo-
tions

expressing particular emotions and moods".¹ This idea is beautifully brought out by O. C. Gangoly in his article on "The Birth of Melodies". Thus if emotions of wonder, resentment and heroism are to be expressed, certain intervals are most prominently used in the composition; similarly, other intervals are used to express terror or disgust, emotions of sorrow and emotions of love and humour. We are thus confronted with a fact that tone is

Sound—a Creative
Energy

made to move and live in the pulsating form, creating within us all sorts of moods and emotions and thoughts. Sound, therefore, is a creative energy, bringing into life, into rhythmic form, the inert matter.²

¹ O. C. Gangoly, "The Birth of Melodies", in *The Aryan Path*, January 1937.

² For details see *Ragas and Ragini*, by O. C. Gangoly.

And it is this fact that sound is the builder of form that "makes possible the gramophone record and the sound film".¹

Sound, Builder of Forms The Ancient Wisdom teaches that "at the periods of new generation, perpetual Motion becomes Breath; from the Breath comes forth primordial Light, through whose radiance manifests the Eternal Thought concealed in darkness, and this becomes the Word (Mantra). It is That (the Mantra or Word) from which all This (the Universe) sprang into being".² The above may sound too abstruse or imaginary to a western ear but to a student of eastern Occultism, it has a deep significance. "God's universe of form starts with sound".

Just as a variety of patterns is formed on an iron plate strewn over with the particles of sand, when a string bow is drawn across its edge, so when the Master Musician plays upon the harp of the primordial substance, it vibrates in unison with the principles of musical harmony and lo! there is the birth of cosmos.

We thus get a faint idea of the truth of the statement of Christian cosmogenesis: "In the beginning was the Word, and the Word was with God, and the Word was God". Geoffrey Hodson puts it beautifully when he says:

The Logos chants the mighty mantram of His being, the creative energy pours forth in the primordial substance, and Cosmos is born.³

Sound has a deeper significance with the people of the East than that of the West, for every letter of the eastern alphabets is endowed with power and potency, which in various combinations and when rightly pronounced can work wonders, that modern science notwithstanding its present achievements is unable to fathom and explain. Indian yogis have made a deep and special study of the science of colour and sound. They say colour and sound are inseparable. Wherever there is sound, there is colour; and wherever there is colour, there is sound, in the same way as noumenon and phenomenon, life and form, energy and matter are inseparable.

Many a time it is asked, "Which came first, light or sound?" In the light of the above it can be said that both manifested simultaneously, they being the two aspects of the one Reality.

¹ *Theosophy and Music*, by Norman Ingamells, T., Oct. 1946, p. 34.

² S.D., Vol. III, p. 226.

³ T., April 1936, p. 11.

The Sanskrit language which is supposed to be the mother of languages in the present Round is composed of 50 letters (16 vowels and 34 consonants) and is divided into seven groups, as Sutturals, Palatals, Linguals, Dentals, Labials etc. Each letter is again divided into what is called "mātrās", and each "mātrā" is further divisible into 64 points. The dissection of an alphabet cannot be made more complete than it is done in Yogic science.

The beauty of this alphabet is appreciated when we find that the letters are arranged and grouped in rhythmic flow in accordance with the elements (Tattvas) each belongs to, e.g.:

		States of matter into which each group falls.
	क ख ग घ ङ ॥ ह ॥ k kh g gh ṅ ॥ h ॥	Earth (pṛthvi)
	च छ ज झ ञ ॥ य श ॥ c ch j jh ṇ ॥ y ś ॥	Water (apas)
Rythmical Arrangement of Letters and Mantras	ट ठ ड ढ ण ॥ र ष ल ॥ ṭ ṭh ḍ ḍh ṇ ॥ r ṣ ḷ ॥	Fire (tējas)
	त थ द ध न ॥ ल स ॥ t th d dh n ॥ ḷ s ॥	Air (vāyu)
	प फ ब भ म ॥ व ॥ p ph b bh m ॥ v ॥	Ether (ākāshic)

Each letter of the group again has attributes belonging to the particular elements, e.g.:

The first letter has Earthy attributes.

„ second „ „ Watery „
„ third „ „ Fiery „
„ fourth „ „ Airy „
„ fifth „ „ Ākāshic „

and so on with all the other groups.

Moreover, each group of these letters governs a particular part or parts of our bodies, e.g.:

The first group governs the parts from feet to the end of the spinal column (Mūlādhār).

„	second	„	„	„	„	Mūlādhār to Navel.
„	third	„	„	„	„	Navel to Heart.
„	fourth	„	„	„	„	Heart to Throat.
„	fifth	„	„	„	„	Throat upwards.

One may conclude from this that the letters one finds in this alphabet have been placed there not haphazardly as if by chance but classified and arranged with a set purpose in accordance with definite rules governing the principles of sound. A great science has been built up on a sound knowledge of these principles which is utilized for healing and for general good.¹

We get an insight into the *modus operandi* of these 'mantras' from what C. W. Leadbeater writes on pp. 382-4 of his book *The Hidden Life of Freemasonry* about the working of an ancient Indian mantra investigated by him at the request of Sir S. Subramania Iyer of Madras—a mantra 'which he had been using for many years, and which had been given to him by Swami T. Rubba Rao, a great South Indian occultist'. C. W. Leadbeater writes: "This mantra is found, I am told, in the Gopālātāpani and Krishna Upanishads, and is composed of five parts,

¹ The following quotation from Ch. XXVIII on *Mantra-Sādhana* in Sir John Woodroffe's book "The Garden of Letters" will be found illuminating by those who are interested in the subject. Those who wish to know more about it may with advantage read this chapter.—ED.

A mantra is composed of letters. Letters and their combinations as syllables and words are all forms of manifested Shabda, that is, Brahman-forms. They are each and all forms of the Creative stress, as uttered by the mouth, heard by the ear, and apprehended by the mind; but what are ordinarily called Mantras are those particular sounds which are used in worship and practice (Sādhana) which consist of certain letters, or letters arranged in a definite sequence of sounds of which the letters are the representative signs. . . . The Mantra of a Devatā * is that letter or combination of letters which reveals the Devatā to the consciousness of the Sādhaka, who has evoked it by Sādhana-Shakti. . . . This Mantra is intoned in the proper way according to letter (Varna) and rhythm (Svara). For these reasons a Mantra, when translated, ceases to be a Mantra, that is, the sounds heard and uttered in the translation are not the body of, and do not evoke, the Devatā. We are then not dealing with the same sound, but with a translation in another language, with other sounds giving the meaning to the intellect of the Sanskrit Mantra. This shows that Mantra is not mere individual thinking but a particular sound-body of consciousness,

* Angel.

as follows: (1) Klīm, Krishnāya, (2) Govindāya, (3) Gopījana, (4) Vallabhāya, (5) Swāhā. As one meditates upon this with intent each syllable makes a line in such a position that a five-pointed star results. And as the mantra is repeated these stars pile up behind one another to form a tube having this five-pointed form of cross-section, which makes a channel for spiritual force" to come through. The fact that this 'mantra' is used for the cure of scorpion bites is known to many people.¹

Madame H. P. Blavatsky records her own personal experience about the power of sound in the following words :

We say and maintain that Sound, for one thing, is a tremendous Occult power; that it is a stupendous force, of which the electricity generated by a million of Niagaras could never counteract the smallest potentiality when directed with Occult Knowledge. Sound may be produced of such a nature that the pyramid of Cheops would be raised in the air, or that a dying man, nay, one at his last breath, would be revived and filled with new energy and vigour. . . . *As one saved thrice from death* by that power, the writer ought to be credited with personally knowing something about it.²

* * * * *

Let us now come back to our electron and view it from yet another angle. When an electron jumps from one orbit to another, this is supposed to happen almost instantaneously. It takes no fraction of time whatever, not even the minutest, in the change. Until 1900, it was universally

Theories of Light believed that all radiation (Light, Heat, etc.) was continuous. Radiation had all along been studied for a century in the full light of a wave-theory which implied a continuity. In certain experiments it was observed that when light was added to light darkness was produced. This phenomenon was called the interference of light and could only be accounted for by the wave-theory of light. Newton's corpuscular theory had to be abandoned as it could not explain this. But the matter did not rest here. Enough evidence was gathered to show that the corpuscular theory could not thus easily be got rid of. Electrons were found to be emitted from substance which was exposed to light and it was expected that the intensity of light would make the electrons move faster, but that was not what was observed. It was seen that however feeble the

¹ There is a science of colour, sound, form and numbers. They all go together. The sages of ancient India had a knowledge of this science. There is a vast field for research here, as the writer of this note could personally testify from the successful cure of two scorpion bites by him by the making of a five-pointed star. It is a field of research in which scientists and occultists may well collaborate.—Ed.

² S.D., I, 606.

light might be, it was the wave-length of the incident light which determined the velocity of the emitted electrons irrespective of the intensity of light. The shorter the wave-length, the greater was the velocity. X-rays, whose wave-lengths were much smaller than those of light, would therefore emit electrons at very high speed. Now we know that X-rays, or as a matter of fact all rays, spread out in an expanding sphere round the point of impact. We would naturally expect that as the spherical wave expanded, it would get feebler and feebler as it moved on as the ripples on the surface of water would do. But what did the scientists find instead? The sphere was moving on as if with the original velocity not slackening in speed in the least. In the words of Sir William Bragg :

It is as if one dropped a plank into the sea from a height of 100 feet, and found that the spreading ripple was able, after travelling 1,000 miles and becoming infinitesimal in comparison with the original amount, to act upon a wooden ship in such a way that a plank of that ship flew out of its place to a height of 100 feet.¹

This analogy could only be explained in the light of the corpuscular theory, and scientists had perforce to accept it.

Light and Planck's Constant Light under this theory could radiate in bullets, in bundles, in atoms, the measurements always resulting in integral multiples of $h\nu$, h standing for Planck's universal constant and ν for the frequency. There is no fractional part of $h\nu$. This bullet, this unity of light, is called a "photon", which has mass, momentum and energy like any other particle in motion. The total emission of these bullets from the sun amounts to 250 million tons of mass a minute.

In this way all the stars in the sky are sending out a constant stream of vibrations in packets and bundles, and the earth is bathed in waves ranging from the deep bass of wireless signals, through the treble of visible light, to the soprano of the cosmic rays, the whole gamut of notes that make up the harmony of the universe. In short, modern science says that electricity, light and all radiations are atomic. In this connection compare *The Secret Doctrine*, Vol. I, p. 136 :

Electricity is "immaterial", in the sense that its molecules are not subject to perception and experiment; yet it may be—and Occultism says it is—atomic.

¹ Quoted from J. W. N. Sullivan's *Limitations of Science*, p. 84.

Students of Theosophy will recognize that the principle of discontinuity (or quanta) is a very fundamental thing in Nature. *The Secret Doctrine*, while outlining the evolutionary scheme, abounds in this. From the very beginning everything seems to have been brought about by successive steps. The Law of Periodicity originated in the impulses given by the great life-waves at different periods; the Creative Principle thereof First Outpouring into the ocean of primordial substance its activity, finally changes it into the atoms we call matter on the physical plane, then the Second Outpouring arranges the atoms and builds them into forms, and when the forms are ready for individualization, there comes the Third Outpouring.

The tide of life—the wave of existence, the spiritual impulse, call it by what name we please—passed on from planet to planet in *rushes*, or *gushes*; not by an even continuous flow.¹

So far, so good. But the puzzling and disconcerting fact remains that the wave-theory of light cannot altogether be ignored. Certain experiments can only be explained by the wave-theory and not at all by the corpuscular theory.

Dual Behaviour of
Light and Matter

Scientists therefore were obliged to say that light or radiation behaved in a dual way, sometimes like particles and sometimes like waves. Strange to say that matter which so far consisted of electrons and protons, behaved also in the same dual capacity. So we have particles behaving like waves and waves behaving like particles, a strange but significant phenomenon, one which leads us to believe that this duality may be the manifestation of an ultimate unity.

"To Occult Science, *force* and *matter* are only two sides of the same substance".² In this dual behaviour we again find, as we found in the pairs of complementary colours, that the subjective and the objective aspects of one reality go hand in hand. "There is no objective phenomenon without its exact subjective equivalent, and no subjective action without its equivalent objective phenomenon".³

¹ A. P. Sinnett, *Esoteric Buddhism*, 1888, p. 46.

² S.D., I, 683.

³ W. Kingsland, *The Physics of The Secret Doctrine*, p. 66.

Prof. Crowther, in his monograph on Radiation,¹ very graphically describes the present world-picture. He says :

What, then, is matter ? We look out upon this seeming-solid globe of ours, its mountains and valleys, its pleasant fields and busy cities, its cloud-capped towers and gorgeous palaces. What are they but radiation—radiation imprisoned in electrical bonds . . . What is their mass but an expression of the intense energy locked up in their minutest particles ? Free them from their chains and they become photons, radiation of the smallest wave-length and hence of the greatest intrinsic energy known to science, travelling out through space at the greatest speed known in the universe.

What is radiation ? . . . Radiation is the fundamental stuff of which the universe is made. It is pure energy, so concentrated that it can act as a particle, and yet energy associated with vibrations or waves. It is the unity underlying the apparent diversity of the universe.

The picture drawn above concerning the nature of matter and light was suggested years ago by Madame Blavatsky in *The Ancient World-Picture Secret Doctrine*. Though the facts were not expressed by her in modern technical terms, they indicated vividly what was in the mind of the author regarding the mysterious relationship of energy and matter. She writes :

It seems ridiculous to argue that because a thing is imponderable to Science, therefore it cannot be called matter. Electricity is "immaterial", in the sense that its molecules are not subject to perception and experiment ; yet it may be—and Occultism says it is—atomic ; therefore it is matter.²

To know what light is, and whether it is an actual substance or a mere undulation of the "ethereal medium", Science has first to learn what Matter, Atom, Ether, Force, are in reality.³

Light and heat are the ghost or shadow of Matter in motion.⁴

For the Occultists it [Light] is both Spirit and Matter. Behind the "mode of motion", now regarded as "the property of matter" and nothing more, they perceive the radiant Noumenon.⁵

Again in Vol. II, p. 179, we come across such words as "the mineral—which is light itself, crystallized and immetallized". Many quotations

¹ *The Great Design*, edited by Frances Mason. pp. 59-60.

² S.D., I. 136.

³ S.D., I. 523.

⁴ S.D., I. 561.

⁵ S.D., I. 521.

may be cited on the relationship of light (electro-magnetic radiation) and matter.

All contains and is Electricity, from the nettle which stings to the lightning which kills, from the spark in the pebble to the blood in the body.¹

We have said above that matter and radiation, or particles and waves, were considered to have merged their duality of behaviour into a unity. When this single unity chooses to manifest itself like waves and when like particles and how it does it, science is unable to say at present. What determines the particular choice in the behaviour of the entity is not known. There come now a host of physicists with their different theories to explain this phenomenon. Louis de Broglie, Schroedinger, Heisenberg, Dirac, a band of brilliant mathematicians, began to work, each in his own way. At this stage Heisenberg enunciated a great principle

Heisenberg's
Principle of
Indeterminacy.

called the "Uncertainty Principle or the Principle of Indeterminacy", a principle which is supposed to be as important as that of Relativity. It was discovered that it was not possible to determine accurately both the position and velocity of an electron. Both are possible if much accuracy is not wanted. But aiming at the accuracy of one, will lead to a corresponding inaccuracy in the determination of the other. There is a positive uncertainty in the accurate determination of one of the two, and both cannot be determined equally very accurately.

If p represents the position of an electron and q its velocity, it is observed in this instance that the product $p \times q$ is not the same as $q \times p$, which we would naturally expect. Ordinarily $pq - qp$ is zero in the classical mechanics but it has an entirely different value in the new physics. The error made in measuring the position of an electron multiplied by the error made in measuring its velocity is never less than a certain quantum which the physicists know as Planck's constant. However perfect our methods of experimentation may be so as to reduce the product of the two errors as much as possible, it cannot be reduced to less than this limit. Each time the experiment is made to reduce one error, there crops up a correlative increase of the other error. This limit is therefore in the nature of things themselves and "no perfection in operation can end it or push it off further". This principle of indeterminacy or uncertainty

¹ Trans. Blav. Lodge, ii, p. 27, quoted from *The Physics of The Secret Doctrine*, p. 133.

is due to the fact that "every observation alters the state of the object observed" (Heisenberg) just in the same way as "a fisherman dragging up a fish from the depth of the sea, disturbs the water and also damages the fish" (Jeans, *Physics and Philosophy*, p. 172).

It is very gratifying to learn that certain corroboration and correlation of some of the facts mentioned above, are found in *Occult Chemistry*.¹ C. Jinarajadasa tries to explain Heisenberg's principle of indeterminacy on the basis of the investigations made on the ultimate physical atom of Occult Chemistry :

1. "To look at an ultimate physical atom (u. p. a.) modifies it" (this is exactly as what Heisenberg has stated "every observation alters the state of the object observed".)
2. But each ultimate physical atom is (sort of) looking at every other u. p. a.; it cannot help looking any more than a human being can live isolated and uninfluenced.
3. Each u. p. a.—and all things greater in size—is modifying every other thing. This is Brotherhood in excelsis.²

Jinarajadasa, commenting on Heisenberg's Principle of Indeterminacy, says that it is due to the fact that "all matter (electron, even the bubble in Koilon) is a *fragment of Consciousness of the Logos*. Each Koilon bubble is movement, energy, thought, feeling, aspiration, beauty, love, etc. The Logos is imprisoned in each, is trying to reveal the fullness through each; therefore there is an outward pressure from each to every other. Each instant the balance of forces is changing. Each u. p. a. *feels and thinks*; we must not think of it as a mere "force"; each is modifying every other.

"All the modifications tend to a certain direction—towards the archetype. But *everything is indeterminate*, in the sense that everything influences every other thing to release, or to imprison. It is all simple—Brotherhood !

"A revolutionary fact is the explosive pressure within each u. p. a. to *reveal* more and more, as if the Logos were *bursting* with desire to throw outwards all that is inward. When Science establishes this principle, all the old values will need revising".

¹ *Occult Chemistry*, by Annie Besant and C. W. Leadbeater.

² See p. 54, *Main Currents*, April 1941, Einstein's view.

³ *Where Modern Physics is Going*, by C. Jinarajadasa, T., p. 83, October 1948.

And indeed if modern scientists will look with a kindly eye to the statements made by the occultists and take them even as hypotheses and build their structures on them, they will find a new path opened to them for the solution of many problems in future.

Turning to our subject, this principle of indeterminacy therefore strikes at the root of the old ideas of determinism and causality. "Whilst indeterminacy enters from one door, causality disappears from the other". In the microscopic world of electron, there is a free choice of Nature where physical laws are "only expressions of probabilities and not expressions of precise and determined bonds", which would be the case when objects are taken in a mass macroscopically. Up to 1927 the physicists had considered that the material forces of Nature were determinate and could be predicted, but now it is observed that "Nature makes a choice", that a particle behaves as if it were a living thing. It has a choice of its own which cannot be predicted. "No law of Nature *obliges* an element to take one trajectory rather than another". Nothing can predict when it will behave as a wave and when as a particle, just as it is not possible to determine when a dog will wag its tail or when a monkey will take a jump, for this is an action which cannot be governed by physical laws but by laws of life only. So is the behaviour of the electron. The distinction between living and dead matter is now gone.

Professor Boycott says in *Nature* of January 19, 1929 :

The vitalistic controversy in anything like the form it has taken during the last forty years is out of date, that instead of emphasizing the difference between live and dead things we should make as much as we can of their similarities and that instead of dividing the world into two distinct categories, we should regard it as being made up of one series of units with properties which differ more in degree than in kind.

This Madame Blavatsky said long ago :

The *matter* of science may be for all objective puposes a "dead and utterly-passive matter"; to the Occultist not an atom of it can be dead—"Life is ever present in it".¹

The Secret Doctrine further says :

Everything in the Universe, throughout all its kingdoms, is *conscious* :
 i.e., endowed with a consciousness of its own kind and on its
 own plane of perception. We men must remember that,
 simply because we do not perceive any signs of consciousness
 which we can recognize, say, in stones, we have no right to say that *no*

¹ S.D., III, 399.

consciousness exists there. There is no such thing as either "dead" or "blind" matter, as there is no "blind" or "unconscious" Law.¹

We are now entering into a new phase of the New Physics which has brought about a great change in our conception of the structure of the nucleus, the central sun round which the electrons revolve.

We have learnt that an atom consists of two sections, *viz.*, the electronic and nuclear. Each section plays a definite part. Firstly, the arrangement of the electrons surrounding the nucleus may be changed and all chemical reactions are due to these changes in the arrangement of the electrons. Secondly, it has been observed that the nucleus consists of other entities also, besides the protons. The constituents of the nucleus so far determined are Protons, Neutrons, Positrons, Deuterons, Mesons, Neutrino and Alpha particles. All these constituents are electric in their nature. It may be that some of these are combinations of the others. But what a complex picture it presents to our mind when it is compared with the hard solid massive atom like a billiard ball—indivisible and undissectible which was taken as an ultimate unit of matter some years back.

These particles within the atom may be disturbed and then new arrangements take place. Such re-arrangements are called nuclear changes. These changes in the first place may transform one chemical element into another, and in the second place, whenever such changes occur, energy is either absorbed or released. If the change is such that it makes the system more stable, energy is released. Now the particles within the nucleus are held together with a very tremendous force and consequently

even when they re-arrange very slightly, the amount of
 Atomic Energy energy released is enormous and it is altogether of a different order from the energy we receive by burning coal, oil, etc. It is said that one Kilogram (2.2 pounds) of coal would give 8.5 Kilowatt hours of heat energy whilst one Kilogram of matter, if converted *entirely* into energy, would give 25 billion Kilowatt hours of energy. It is this latter energy which is called Atomic energy so frequently spoken of these days because of its use in World War II.

This energy has unfathomable potentialities that promise to affect vitally the life of man, and when it is harnessed for the constructive work for the benefit of mankind the face of the earth will then bear a different aspect. Before the power of this energy, the transformations of elements shade into insignificance.

¹ S.D., I, 295.

We have not yet spoken of another energy, very powerful and penetrating, known as Cosmic Radiation. It is richer in energy than any radiation of which we know. Its wave-length is even shorter than the hardest Gama-rays. It easily penetrates several feet of solid block of lead and its action can be recorded nearly 2,000 feet under water. According to Eddington, these rays might travel for 10^9 light-years without suffering undue absorption. More recent experiments have shown that highest energies possessed by these rays are of the order of one hundred million million volts. From astronomical measurements on radiant energy in free space and in the nebular it is estimated that the total energy in the free space existing in the form of cosmic rays is many times greater than the energy existing in all other forms combined. To what immense utility this penetrating energy can be put to, the Future only can answer. It is difficult to say whether it is pure radiation or high-energy charged particles or both, but however mysterious this Cosmic Energy is, as regards its nature or source, it may be safely said that it appears to owe its existence to the atomic processes going on in the stars, far far in the heavens above.

More recent investigations, however, show "that some of the Cosmic rays have an energy a million times greater than the Atomic energy referred to above. In Cosmic radiations, Nature has provided us with the biggest atom smashing instrument in the world and the whole surface of the earth is our laboratory."¹ Study of interactions between cosmic rays and atmospheric gases has revealed the presence of peculiar type of particles, named "Mesons", (mass 40 to 500 times that of the electron), which have a very short period of existence in free state but which, when disintegrating, generate two kinds of particles, viz., the electrons and the neutrino, the sum total of whose mass is only a small fraction of the mass of the disintegrating meson. What has then become of the remaining mass? The rest of the mass is converted into energy. This conversion of mass into energy was predicted by Einstein years ago while considering relativity problems and is of profound importance to science. Since the mass of neutrino is very negligible, almost the whole of the energy released is taken up by the electrons. Bhabha in collaboration with Heitler, a German professor, is of the opinion that these fast moving electrons cause to release Cosmic energy under certain conditions

¹ Address by Dr. H. J. Bhabha, F.R.S., at the Tata Institute of Fundamental Research, Bombay.

while passing through matter. During the process various particles appear to emerge, but they are so short-lived that as soon as they are born they disappear in a flash of radiation. We saw the birth of meson ; there are also other particles carrying the positive charge of a proton but the mass only of an electron. They are in fact positively charged electrons and are therefore named positrons. How complex an atom has now become ! The old simplicity of electron and proton has gone. Who knows, in course of time, it may be discovered that these nuclear and electronic particles, these wavicles, may be resolved into still subtler wavicles and energy more penetrating and terrific than the Cosmic energy may be produced !

Are we to suppose that these particles are really elementary in a fundamental sense ? Sir George Thomson says that
 Substance-Principle "more probably they are different aspects of some underlying reality".¹ Occult science confirms this and says further that there are cycles within cycles of sub-states of matter, subtler and subtler and the more you dig into the very heart of the atom, within and yet within, you will find that "underlying reality" where Force and Substance are combined into the primitive Root-Principle which is termed by the Occultists Force-Substance or Substance-Principle.

And note what Lowson says in *Science and Reality* :

A primitive unity manifesting itself in a duality of spirit and matter, lies at the basis of cosmogonies and philosophies ; yet this is merely a first step in differentiation, and the process can be continued to any degree of complexity. The noumena immediately behind physical phenomena may themselves be phenomena to noumena on a still higher plane, and so on up the scale. The physical plane is but the end-product of a long scale of differentiation, descending by degrees.

This is exactly the teaching of Theosophy :

The physical Plane is a Plane of *effects*, not of causes ; it is in fact a Plane many times removed from the Plane of Primal Cause, and the effects or phenomena discernible thereon are not primary, nor even secondary effects, but effects many times removed from the ultimate Cause or Noumenon.

The relation of any Plane to the one next below it is a *force* relation ; the higher Plane literally *ensouls* the lower.²

The Occultists, who have good reasons for it, consider all the forces of Nature as veritable, though supersensuous, states of Matter ; and as possible objects of perception to beings endowed with the requisite senses.³

¹ *The Atom*, p. 175, by Sir George Thomson.

² *The Physics of The Secret Doctrine*, pp. 11, 25.

³ S.D., I, 167.

Indeed, door after door of undreamt-of aspects of matter and energy, so laconically expressed in the teachings of Theosophy, is being flung open to modern science, and it is a pleasure to note that modern science shorn of its defiant and challenging attitude is now treating occult science with the respect and reverence it deserves.

In this connection the reader's attention is drawn to the recent discussion in *Nature*¹ regarding "a new departure in scientific method, which has grown out of the revolution of thought provoked by relativity theory."² It shows clearly that the old way of looking at things is changing

From Physics to
Metaphysics

and Science is slowly but surely moving towards Metaphysics. "Science cannot, owing to the very nature of things, unveil the mystery of the Universe around us."³ There would be a deadlock in Science if no new technique is applied in its investigations and we, therefore, note with pleasure that a small group of brilliant and, in the words of H. P. Blavatsky, "daring explorers"³ have transcended "the narrow limitations of sense",³ and are investigating the problems lying on the borderland from an angle as viewed by a metaphysician. The gulf between physics and metaphysics is now gradually being bridged over.⁴

Again we have all along been talking about the behaviour of "particles" and "waves". Are they really particles in the sense that a grain of sand is really a particle, and are they really waves in the sense that a ripple on a pond is really a wave? Sir James Jeans in *The Mysterious Universe*, p. 108, says: "We can hardly think of them as being located in space and time at all, they are mere visualizations of a mathematical formula of wholly *abstract* nature". He further says that "the electron exists only in our minds". The centre of gravity of physics has shifted from the realm of objectivity to that of consciousness. The reduction of material things in terms of the mind is now the theme of scientists as it

Universe—an Ex-
pression of Mind

has been that of philosophers. When we come across, in *The Mysterious Universe*, such passages as: "The universe can be best pictured as consisting of pure thought"; "If the universe is a universe of thought then its creation must have been

¹ *Nature*, 3-5-37, p. 784 and 12-6-37, pp. 1,000-1,012.

² *Ibid.*, 12-6-37, p. 1,000.

³ S.D., I, 518.

⁴ In this connection the transactions published by the members of the Theosophical Research Groups in London and at other Centres and the thought-provoking articles written by them from time to time in *The Theosophist* will be found instructive.

an act of thought"; in *The Great Design* edited by Frances Mason, "We are led from our own mind back and back to the Supreme Mind",—we are reminded of the most fundamental of all theosophical doctrines that "all phenomena are modes or manifestations of Life—the operation and play of the One Life which is the Universe".

"To put the conclusion crudely", Professor Eddington says in *The Nature of the Physical World*, pp. 267-68,

the stuff of the world is the mind stuff. All knowledge of our environment enters in the form of messages transmitted along the nerves to the seat of consciousness. It is only our own end of fibres that we actually know.

Lowson in *Science and Reality*, p. 63, says :

Cosmic Mind and Cosmic Energy constitute a unity in which Cosmic Mind is the initiating, impelling and directing activity.

We read in *The Physics of The Secret Doctrine*, p. 37 :

The Universe is the expression of Life, Thought, Consciousness. These are the energizing, guiding Principles in all Cosmic Processes, whilst that which appears under the guise of Matter is the objective correlative of this primary activity of the One Life, or Be-ness.

Thus the physicists have unconsciously entered into the region of metaphysics, and the ultimate definition of matter is a metaphysical one, namely, matter is that which is objective to consciousness.

Matter, to the Occultist, it must be remembered, is that totality of existences in the Kosmos, which falls within any of the planes of possible perception.¹

It is not unlikely that the next few years will see another great leap, another step forward, towards the thought given out in the Ancient Wisdom.

Occultism sees in all these Forces and manifestations a ladder, the lower rungs of which belong to exoteric Physics, and the higher are traced to a living, intelligent, invisible Power, which is, as a rule, the unconcerned, but, exceptionally, the conscious Cause of the sense-born phenomena designated as this or that natural law.²

If we trace the historical development of science, we find that it indicates the gradual unfoldment of a Plan,³ of a scheme of evolution, and that evolution proceeds in different stages step by step as if in spirals. From a practical worker, seeking only the results, caring not for any explanation of the

¹ S.D., I, 560.

² S.D., I, 605.

³ See in this connection *Studies in Evolutionary Psychology*, by Preston and Trew.

observed facts, the scientist turns to alchemy and allied arts, giving vent to his emotional nature which is the predominant note of the time. He then changes his venue and makes reason his God. Inductive method and intellectual freedom bring in their train scientific revolution—presenting the world as a gigantic clock-work which plays its tune mechanically; this is followed by the development of his “social sense” (as Prof. Marcault has phrased it) by the application of science to industry and art, ultimately leading him to the spiritual sense of beauty and intuitive perception. We have seen the atomic theory develop into the electronic theory, the electronic into the quantum theory, the quantum theory into the wave theory, this last a mere abstraction arrived at by mathematical intuition. As the scientist unfolds his consciousness, he contacts more and more of Nature, rising from the plane of emotion to that of mind, from mind to that of intuition. The natural laws remain the same in all ages. It is man’s understanding of them that changes. But in each new understanding and in each unfoldment of scientific thought, a new aspect of the Truth is revealed. Let us not forget that the old theories have paved the way for the New Physics, for each theory was a necessary step in the ladder of evolution. Let the scientists and philosophers approach it in their own respective ways. To each is revealed the partial truth. But the whole Truth, Truth Absolute, evades them all. Science, Philosophy, Creative Art, Religion, Metaphysics, Occultism and Mysticism, each is a flower of individual unique beauty and splendour representing one facet of Truth. But if all these are brought together and tied with the golden thread of Theosophy or Divine Wisdom to make a bouquet, it will present a beauty and splendour which will far excel any single flower. That Beauty, that Splendour, that Truth Eternal, abides within the heart of each one of us. If we only knew how to enter the secret and sacred repository of our hearts, if we only knew how to feel and realize the God within us, we should see that Truth shining forth in the magnificent splendour of its pristine Beauty and Glory.

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MATTER AND THE ATOM

BY G. MONOD-HERZEN

INTRODUCTION

THIS Series of monographs is intended to indicate the points where
Inquiries after
Truth Theosophy and Science meet. Properly speaking they
should meet everywhere, for both are disinterested
inquires after Truth. But neither of them is yet complete: they are alive and so possess one concomitant factor of progress—an infinite succession of ignorances.

But as the objects and methods of these two schools of inquiry are different, it follows that Theosophy is acquainted with many things of which Science as yet knows little or nothing and vice versa.

The department in which this disparity is most obvious is probably that which deals with the physical world and with matter. This is a pity, because this department is necessarily the one to be first investigated by those who wish to base their studies on objective knowledge. However spiritual a theory may be, it must necessarily admit the existence of a physical world, and in some measure explain it.

Matter, Field of
Human Evolution Theosophical knowledge has not failed in this respect, but it has
touched upon it only incidentally. For Theosophy,
matter is primarily the field of human evolution. That
explains the comparatively small amount of information
on the subject found in theosophical classic literature. On the other
hand, western Science has spent twenty-five centuries on the study of
matter, while it has concerned itself with human evolution only during
the last two hundred years. Obviously then, we shall find few points of
contact between Science and Theosophy in this department of knowledge.

This monograph deals with Matter and the Atom from the theosophical and scientific points of view. No definite conclusion is possible;

for only one is useful—an outline of the unknown territories which it is urgent to explore. I will not fail to give this.

MATTER AND THE ATOM

The evolution of Science is seen reflected in the progressive idea scholars have had of the Atom, changing from the indestructible atom of the Greek philosophers to the modern vortex of waves.

We now wish to place side by side the theosophical and scientific conceptions of Matter, in order to show where they coincide and where they differ.

Science considers Matter as a datum of actual observation. The atoms of which this matter consists have been taken as
 Matter, Field of
 Observation endowed with such characteristics as were required to account for the physical and chemical phenomena in which they took part. Only in the twentieth century, since the discovery of radioactivity and the study of the evolution of the stars, has the question of the evolution of matter and of a derivative relation between the atoms been posited.

But Theosophy considers Matter as essentially not only subject to, but also as a means of, evolution. It posits many different types of matter, of which only a small part is accessible to our senses and as such studied by Science. It is only recently that theosophists have concerned themselves with the study (by their own methods) of the states of matter known to Science. Their methods are observational ones, that is, these theosophists claim to know by direct observation the form and structure of the fabric of the atom. We have thus quite another field from that of the scientist, for the latter does not perceive in any way the atoms themselves, but strives to imagine their shape and structure so as to explain their characteristics, which characteristics alone are within his perception.

Starting from such different points of view, it is not astonishing that Science and Theosophy should finally reach conceptions differing equally in aspect. We shall now try to summarize these conceptions, stressing their essential features.

THE THEOSOPHICAL FIELD

Father-Mother spin a Web, whose upper end is fastened to Spirit, the Light of the One Darkness, and the lower one to its shadowy end, Matter; and

this Web is the Universe, spun out of the Two Substances made in One, which is Svabhāvat.¹

The idea of evolution dominates the whole of theosophical teaching. In this teaching matter is considered on the one hand as the result of an evolution suitable to it, and on the other hand as the medium in which other lines of evolution manifest. In order therefore to understand the nature of matter, it is advisable to try to reach as far as possible towards the "origin" of matter.

The "Origin"
of Matter

Now matter itself is eternal, but in any given part of the universe its manifestation has a beginning. We shall deal with that part of the universe containing our solar system, with which alone most of the theosophical observations deal.

Before this solar system arose, there existed Primordial Matter, described as being composed of innumerable Bubbles, empty and homogeneous (called in several theosophical works Koilon) and existing in the Womb of Space.

All matter is composed of groups of these bubbles. Matter is thus a kind of foam, depending for its existence on the Creative Power, which shapes and sustains these primordial bubbles—actual units of creative energy.

The Creative Power which functions at the genesis of the solar system thus finds this Primordial Matter available and organizes it; that is, it submits this Matter to the play of various kinds of Energy and this brings about definite groupings of bubbles of varying structure, which serve as types of "bricks" to be used in the building of the solar system.

There are seven main types of such matter, each having seven sub-types, or forty-nine types in all.

In order to refer to them, we shall use Mr. Jinarajadasa's notation. Each main type will have a number according to its order, and to show the sub-type we shall affix to this a number as index. Thus 1₁ represents the first sub-type of the first type of matter; 7₄ represents the fourth sub-type of matter of the seventh type, and so on.

The totality of a type of matter is called a Plane (or World) and the totality of matter in a sub-type is called a Sub-Plane. The seven planes and their sub-planes can be represented thus:

¹ S. D., the Stanzas of Dzyan, III 10.

Sub-Planes	Planes						
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₂	2 ₂	3 ₂	4 ₂	5 ₂	6 ₂	7 ₂
	1 ₃	2 ₃	3 ₃	4 ₃	5 ₃	6 ₃	7 ₃
	1 ₄	2 ₄	3 ₄	4 ₄	5 ₄	6 ₄	7 ₄
	1 ₅	2 ₅	3 ₅	4 ₅	5 ₅	6 ₅	7 ₅
	1 ₆	2 ₆	3 ₆	4 ₆	5 ₆	6 ₆	7 ₆
	1 ₇	2 ₇	3 ₇	4 ₇	5 ₇	6 ₇	7 ₇

FIG. 1
Types of Matter.

Two hypotheses have been brought forward as to the way in which this matter has been formed. They have the following idea in common. These different types of matter are due to two successive actions of the same Creative Agency (the Third Aspect of the Divine Power).

The first action brings about the groupings of bubbles of six different types, which, with a certain number of the original bubbles, left free and unchanged, will make the seven fundamental types of matter, one for each plane. The second action brings about in each of the planes a modification analogous to the one which has already taken place, and these two actions bring about the required result.

The two hypotheses differ as to the mechanism of these modifications.

First Hypothesis.—We shall state this hypothesis first, although it is the most recent, because of its simplicity. It has been set out by Mr. Jinarajadasa in his *First Principles of Theosophy*.

According to him, the Divine Power in its first phase of activity produces the atoms of the first sub-plane of all the planes. At this stage

Sub-Planes	Planes						
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁
	1 ₁	2 ₁	3 ₁	4 ₁	5 ₁	6 ₁	7 ₁

FIG. 2
Result of first phase of
Divine Activity.

the whole space to be occupied by the solar system is filled with a mixture of these seven types of atoms. In the second phase of its activity, the Creative Power forms the other sub-plane atoms by modifying these seven primitive types. We are not told anything of the mechanism of this change.

Second Hypothesis.—According to this hypothesis the first types of the atoms of the seven sup-planes are not those of the first sub-plane, but those of the sub-plane corresponding in number to the number of the plane, i.e., 1_1 , 2_2 , 3_3 , 4_4 , 5_5 , 6_6 , 7_7 , what we may call the fundamental types.



FIG. 3
Fundamental Types.

And the atoms of the other sub-planes will be formed by the interaction of these fundamental atoms amongst themselves.

A sketch of this hypothesis is to be found in *The Evolution of Life and Form* by Annie Besant. This hypothesis is based on the Hindu theory of Tanmātras.

At the beginning, the space to be later occupied by the solar system (represented by the total square of the diagram) only contains bubbles, that is, matter of type 1_1 . The Creative Energy then causes Matter of type

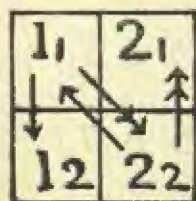


FIG. 4
Action of the second fundamental
type and reaction of the first
fundamental type on
the former.

of 2_2 to appear by radiating out on that space a new kind of Energy which we may call 2. The action of this energy on matter 1_1 will be twofold: (a) it will form atoms of matter of type 2_2 ; (b) it will form atoms of

the type of 1_2 . But by a reaction equal and opposite to this action, the energy of type 1 will disintegrate some of the 2_2 atoms and thus create 2_1 atoms.

SUB-PLANES

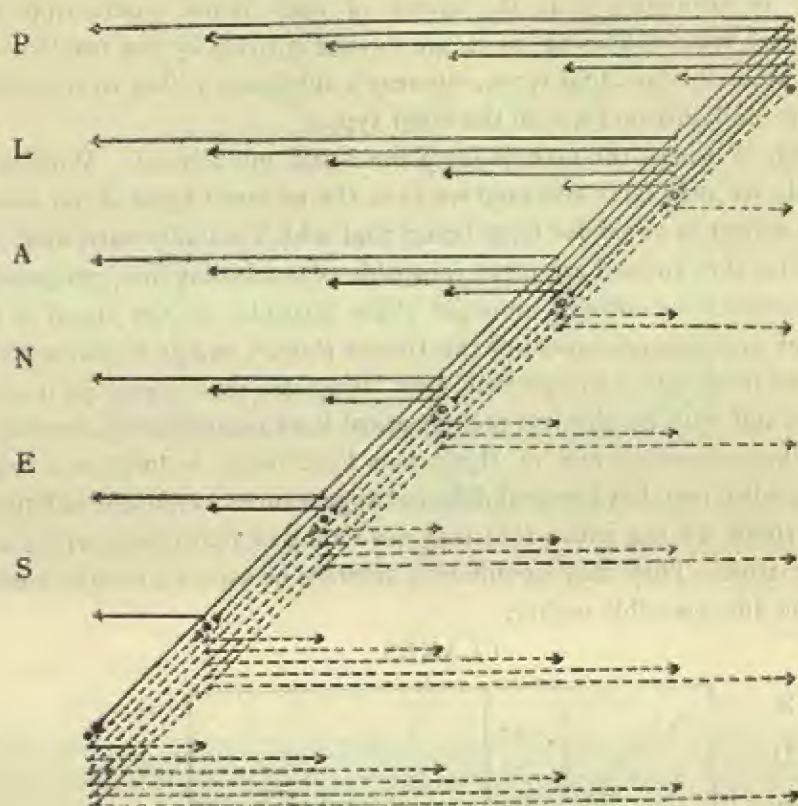


FIG. 5

Formation of the seven planes and their seven sub-planes

It is obvious that this process repeated seven times will bring about the existence of the forty-nine types of matter (see fig. 5).
49 Types of Matter

It will be seen that the characteristic atoms of each plane, *i.e.* 1_1 , 2_2 , 3_3 , 4_4 , 5_5 , 6_6 , 7_7 , are in this theory considered as direct expressions of a definite type of Energy, this Energy having as its essential nature the power to group the bubbles in a definite way. Every particle of Matter is indissolubly connected with the kind of Energy to which it corresponds. And this is necessarily so, for each group of bubbles only exists and remains in existence through the continuance of that energy. It will be seen that in this hypothesis the two phases of activity of the

Divine Power do not act successively in the same way as in the first theory. In this theory the first activity is limited to the bringing forth of the types of energy called 2_2 , 3_3 , etc., and this has, as a secondary result, the formation of the groups 1_2 , 2_1 , 3_1 , 3_2 , 1_3 , 2_3 , etc. (fig. 6).

It is noticeable that the atoms of each plane, apart from the fundamental type belonging to it, are formed entirely by the reactions on it of the other fundamental types, whereas a sub-plane is due to the action of its own fundamental type on the other types.

Fig. 6 shows the process for plane 3 and sub-plane 3. Whichever hypothesis we may have accepted we have the material basis of our world. But this matter is as yet far from being that which actually surrounds us; the particles thus formed are inert, incapable of combining into compounds. The appearance of affinity amongst these particles is the result of the activity of the Second Aspect of the Divine Power, and as to this activity we have no information except that, after its action, matter such as it actually exists and with its physical and chemical laws is completely formed.

When choosing one of these two hypotheses we must not forget that one reality may have several different appearances; even contradictions between them do not prove that they are wrong or that one is wrong and the other true. They may be different symbols or aspects, equally useful, of a unique inexpressible reality.

PLANES

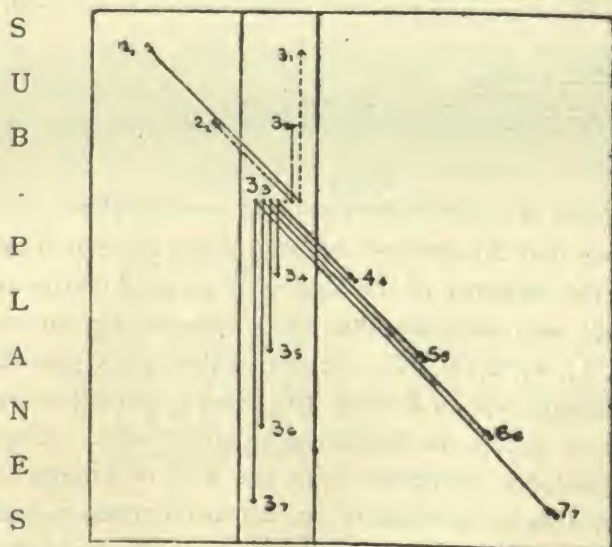


FIG. 6A

Formation of the third plane

PLANES

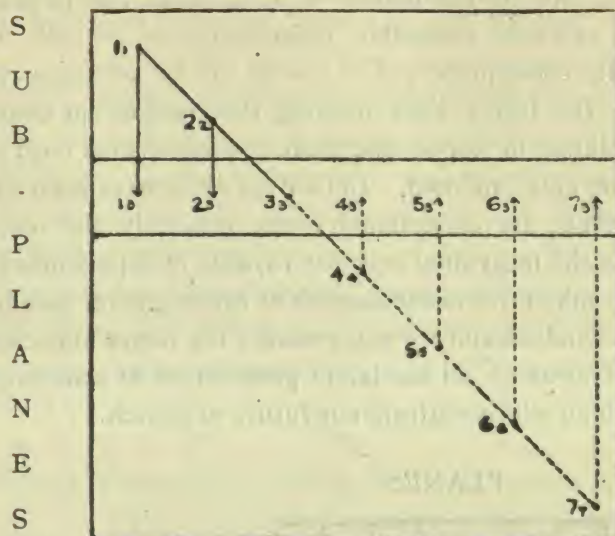


FIG. 6 B

Formation of the third sub-plane

MEANING OF THE PLANES

How in this framework of planes and sub-planes do the objects we know fit in?

The matter of type 7_7 corresponds to matter as we know it in the solid state; the matter of type 7_6 corresponds to our matter in the liquid state, and that of type 7_5 to that in the gaseous state. This includes all the matter we perceive with our senses, and constitutes the physical world. For this reason the seventh plane is called the *Physical Plane*.

The matter of types 6_7 , 6_6 , 6_5 , can affect us, but instead of this effect being one of sensation, which is apparently determined by an exterior object, it seems to be a state of consciousness, springing spontaneously (apparently) within the observer. These states of consciousness will be feelings, and hence the name given to the sixth plane is the *Emotional Plane*. In an analogous manner the matter of type 5_7 , 5_6 , 5_5 is manifested to us by the appearance of thoughts, and this fifth plane is called the *Mental Plane*.

This limitation of the bounds of our knowledge is not absolute. It is not difficult to find individuals capable of consciousness resulting from the action of the type of matter belonging to the fourth or

Intuition Plane, or to the fourth sub-planes of the mental and emotional planes. As to sub-planes 4, 3, 2, 1 of the physical plane, they are more or less accessible objectively to us all in certain circumstances. In consequence, if we wish to be accurate, we should in fig. 7 replace the heavy lines limiting the areas of our consciousness by a thin line taking in about one more row of squares both above and to the left of the area enclosed. Individual differences scarcely account for more. But there are exceptional cases, generally the result of long training, in which the individual becomes capable of experiencing a sphere of objective and subjective consciousness of much greater extent. These cases are very rare indeed and we can consider the larger unenclosed space of fig. 7 as symbolical of all our latent possibilities of consciousness and of development which will constitute our future evolution.

PLANES

S							
U							
B							
.							
P							
L							
A					5 ₅	6 ₅	7 ₅
N					5 ₆	6 ₆	7 ₆
E					5 ₇	6 ₇	7 ₇
S							

FIG. 7

Bounds of the objective
and subjective knowledge
of an average man.

THE SCIENTIFIC FIELD

The field of natural and physical science is essentially that of the physical plane, and more especially of sub-planes 7, 6, 5. The other planes only touch us subjectively and are in consequence a matter of psychology. This is not the place to discuss them, as we are only dealing with the Matter of the physicist.

We must however state that from the theosophical point of view, which is the traditional one of the whole Orient, the essence of scholarship consists in the development of consciousness, so as to be able to know other types of matter and to perceive their corresponding energies. Thus the scholar's own self will be both the matter with which he works and also the

Theosophical
Viewpoint

instrument of his observations. To reach this goal, he must submit to a discipline—his consciousness must be indissolubly bound to an ethical system.

The scientific point of view is quite different. It is a static one

Scientific View-
point

as far as the field of consciousness is concerned. This field, especially the objective field, is considered as fixed, and even as unchangeable. Even so, it is an advantage

to the scholar to possess delicate and well-trained senses, but this is not essential, for the physical plane will furnish him with instruments, extending greatly the limited powers of his senses. The knowledge which he obtains in this way will be deeply *within* the physical plane, and not as that of the oriental along the surface of the other planes. It is clear that facts about the same object gathered by these different methods may differ. This is why a comparison between them is so valuable.

* * * * *

Whereas theosophical science has only a little information on the regions beyond the solar system, scientific knowledge in this direction far exceeds it. It knows that in bound-

Island Universes

less space Island-Universes float, nebulous, in the form of spirals, moving with speeds of the order of thousands of kilometres per second. Immense distances separate them, since light takes at least a million years at the rate of ten billion kilometres per year to pass from one universe to another.

But it takes on an average only about 50,000 years to pass from one extremity to another of such a universe, then the average distance between these island-universes is one-hundredth of their own size; they are relatively near bodies.

Amongst the two million or so of such universes, known to science one is ours. Unusually large, it has the usual shape—a disc ten times less thick than wide, shaped as a spiral. It includes about 50,000 million stars of which our sun is one. When we lift up our eyes on a clear night, we see, in the long ribbon of the Milky Way, the multitude of stars belonging to our nebula.

The rank of our Solar System is of the humblest. But analysis of the light which reaches us from the stars has brought

The Unity of
Matter

to our knowledge a material fact—the unity of Matter.

It can now be stated that we know of no chemical element present in the stars which is not also present on the earth. The converse is not true: we know of many elements present on the earth which do not appear in the stars.

This gives us the hope of obtaining some facts as to the genesis of the elements. We have no certain knowledge on this subject. But we have some valuable facts as to the evolution of the stars. In fact we have so many that, like a traveller in a forest, we can see at one and the same time individuals of all ages. The problem is to know how to place these individuals in the right order and to know in which direction evolution has travelled along them. As far as the stars are concerned, the first part of the problem is solved, and to the second part we have a satisfactory answer.

Obviously we know neither the beginning nor the end of the process. A star is only visible to us when its temperature is at least 2,700 degrees, and the youngest as well as the oldest stars are cold. In their youth they are gaseous, very large—their diameter being sometimes one hundred times that of the sun—and of very low density. This huge globe evolves by contracting, which increases its density and raises its temperature; the latter may rise to 30,000 degrees on the surface of the star, and to some millions at its centre.

Now all energy, more especially light, has mass, and the radiation of the stars makes them diminish in mass, and although their density does not alter much, their temperature decreases, and in time the star becomes invisible.

To this increase and decrease of temperature correspond changes in chemical composition. Their light changes colour and this shows us the appearance and disappearance of certain chemical elements. It is only in the larger stars, the younger ones, that molecules, that is, chemical compounds, are found.

As soon as the temperature rises to 4,000 degrees, only elements are found, metals predominate, but hydrogen is already present. As the temperature rises, the metals progressively lose their importance and hydrogen attains the first rank. Then the heavier metals disappear, the lighter ones follow, and at the highest temperature only hydrogen and helium, the two lightest elements, remain. As the temperature decreases, the elements reappear in the inverse order and finally carbon, the basis of living matter, is present.

One is tempted to deduce from these facts that heat, as its temperature increases, disintegrates the heavier elements into the lighter ones, and then as its temperature decreases allows them to reunite. Thus at

every temperature (and at every pressure) matter would be composed of a definite number of different atoms. This hypothesis is all the more attractive because the masses of the atoms are very approximately integral multiples of the mass of the hydrogen atom.

From this it would not be a great step to conclude that this light atom, which is almost the only one in the hottest stars, is the element which by combining with itself produces all the other atoms.

But to admit this would be to believe that an element does not exist when we do not see it in a star. This is far from being always the case. An atom, when it is surrounded by a rising temperature, begins to emit light at a certain temperature and continues to do so, with definite changes of colour, as the temperature rises; it ceases to give out any light at all when the temperature has been so much raised as to make the atom undergo certain modifications. We can then choose between two hypotheses.

First Hypothesis.—The chemical elements present in a young star are destroyed in the course of the evolution which raises its temperature. This destruction consists in the heavy elements breaking up into the lighter elements, hydrogen and helium. When the heated star cools, the chemical elements are re-formed from the elements hydrogen and helium.

Second Hypothesis.—The chemical elements present in a young star remain intact throughout its evolution; during such period their atoms undergo modifications which do not alter their specific character.

We are not in any way obliged to choose one of these hypotheses to the exclusion of the other as they are not incompatible. It is quite possible that both of them are applicable at the same time. One set of atoms in a young star might be disintegrated into hydrogen, while another set remained almost unaltered.

In order to understand the reason of such uncertainty, we must remember that the state of matter in the interior of the stars is not only unknown to us but unknowable, because we cannot reproduce the conditions in our laboratories. Indeed the characteristics of this interior are the *pressure*, due to the universal forces of gravity acting on all the atoms of the star, and the *temperature*, due to the contraction of the star, through this same agency of gravity.

The admirable work of Eddington has made known to us both the pressures and the temperatures at the centre of the stars.

High Pressures The former are of the order of millions of kilograms per square centimetre and the latter are some millions of degrees. Now the

highest pressures and temperatures we can obtain in our laboratories are a hundred times lower. By carefully using the colossal quantity of heat liberated by atomic disintegration, we can hope to obtain new information about that problem. Our knowledge of the formation of atoms is thus very uncertain, but we know more about their disintegration.

First of all, nature has furnished us with elements that disintegrate spontaneously—the radioactive bodies. The products of such disintegrations are lighter than the original bodies.

The breaking up of the atom is never by halves or thirds. There is always, on the one hand, a large fragment which will be a new atom, often itself radioactive, and on the other hand electric charges, and sometimes very light atoms—atoms of helium. In addition an emission of light—a radiation invisible to the eye—nearly always accompanies this transformation.

The history of a "family" of radioactive elements is fairly easy to describe. It begins with a very heavy "ancestor" of which the unstable atom undergoes a first change. This change may be only electrical—the expulsion of an electron—without a change of mass, or there may be a breaking up—the expulsion of an atom of helium. If the remaining atom is stable, the process ceases, but if it is unstable, the process repeats itself, the mass of the atom progressively diminishes until at last the atom acquires a stable structure.

We must note that we are completely ignorant as to what it is that causes an unstable atom to break up at any given moment. This phenomenon is neither caused nor modified by any physical energy available to us.

In face of these facts it was natural to think that the electrons and atoms of helium were part of the constituents of the heaviest elements. This was the position until we were able to obtain in our laboratories new elements, many of them radioactive. The method of this process was fairly simple. Some known atom was taken as a target and streams of atoms of hydrogen or helium were directed against it. When the process succeeded, the target and one of the projected atoms coalesced forming a new atom. If this latter was stable, the matter ended. But sometimes it happened that the new atom was unstable and then a new kind of radioactivity was observed.

¹ Some further developments in this subject are given in a separate Note on "The Story of Atomic Energy" later on in this Part—Ep.

These artificial radioactivities have revealed to us new constituents of the atoms such as :

- (a) corpuscles electrically neutral, weighing the same as a hydrogen atom, and called neutrons;
- (b) hydrogen atoms;
- (c) positive electrons.

Finally, quite recently, a specially light atom has been disintegrated by merely lighting it up with a suitably coloured light.

THE "SHAPE" OF ATOMS

In order to draw from these facts some conclusions as to the evolution of the atoms, we must indicate what idea we have of the atoms.

We do not know the shape of the atoms, we cannot make any diagram of them which would have the slightest chance of being accurate. Too much stress cannot be laid on this fact—our idea of the atom is a mere symbol. Every time a model of the atom has been constructed, it has had to be admitted that such an atom would not obey some physical law or other. And these models have only been retained because they were of practical use to the theorists.

Without having a detailed idea, we can however describe the main outline of the structure of the atom. All the atoms are in fact built on the same plan. They are approximately spherical, and their mass is concentrated at their centre as a nucleus charged with positive electricity, and very small compared with the total volume of the atom. On all sides this nucleus is surrounded by an electrical field. This field is formed of negative electrons in such a way that the net result of the nucleus and its surrounding field is always electrically neutral. We can make the electrons in this field vibrate by playing on the atom a light of a suitable wave-length. This action results in an absorption and an emission of lights of characteristic wave-lengths, resulting in a definite spectrum for that atom.

If the light playing on the atom is suitably chosen as to its wave-length, it may even expel an electron far from its atom. The latter, deprived of one of its negative charges, becomes positively charged and is indeed a *positive ion*. The electrons of this ion are in their turn capable of vibrating under the influence of light of a suitable wave-length, but the spectrum of the ion is totally different from that of the atom which gave rise to it.

It is possible in this way, by a succession of such actions, to take away, one by one, each of the negative electrons of an atom and to leave it with only its positive nucleus. Any matter formed by a majority of such ions of such naked nuclei would have very different properties from matter built up from neutral atoms, such as we know it. We can see matter of this type in special cases, such as in the neon tubes used to light up certain buildings, and more easily by looking at the sun the matter of which is just in this condition.

Now the sun is a star, and we glimpse what recent research has confirmed—that the matter of the stars is not in the same condition as the matter on our earth. The former is in a state of ions. It is the bombardment of these atoms, bombardment of which the energy is characteristic of the temperature of the star, which sets their electrons in motion—an emission of light takes place which brings about the transformation of a large number of its atoms into ions.

Can this ionization attack the nuclei themselves? We have stated above that this phenomenon has been once produced in a laboratory. We do not know whether it takes place in the interior of the stars. Neither do we know whether the tremendous pressures (which would increase the frequency of the atomic bombardment) or the enormous temperatures (which would increase the energy of the bombardment), which exist in the interiors of the stars, are sufficient to integrate the light atoms into heavy ones. But both these phenomena are possible.

If such phenomena are accepted, then the first phase of the evolution of the stars would no longer be considered as the beginning but as the end—a disintegration, complete or partial, of a star, in which its matter is gradually brought to the condition of its elementary particles. According to the highest temperature of which the star was capable (and this temperature depends only on its initial mass), the atoms would be more or less completely ionized or disintegrated into lighter nuclei.

The Evolution of the Stars

The maximum temperature would correspond with the critical point of this evolution, at the genesis of the formation of a new world. The temperature, which causes ionization and therefore disintegration, then diminishes, but the pressure continues and combinations of atoms result (by aggregation) of not only the hydrogen nuclei, but of other kinds of light elements. All the atomic nuclei thus formed by chance bombardments are not stable; some, like those formed artificially in the radioactive

experiments in our laboratories, disintegrate at once; others more stable give rise to radioactive "families" which slowly die out; yet others are stable and will form the permanent matter of the new star.

The latter soon passes out of our ken, and from that moment our ignorance is complete. What happens to the dark stars? Is there a way, by which they may one day be brought back to the condition of a giant star? What part do the nebulae play in this evolution? The answers to these questions lie in the future.

FURTHER THEOSOPHICAL VIEWPOINT

It is difficult to compare the two viewpoints which we have just summarized, on account of the double evolution outlined in theosophical teaching. First of all the formation of different types of matter by the emanation of creative energy on the Primordial Substance, then the vitalization of these types of matter by the emanation within them of the Second Aspect of the Divine Power.

Now it is very difficult to conceive this matter as amorphous and inert before its vitalization. The physical properties such as crystalline structure and the chemical properties of an atom are not separable from its structure, since the latter has just been devised to include and explain its properties. But we can try to give their scientific names to the sub-planes of the physical plane of the theosophists.

One theory has been that the first sub-plane, 7_1 , is the plane containing matter in the state of isolated atoms, and sub-plane 7_7 contains the most complicated compounds found in living creatures. This is an ingenious idea, but is contradicted by what we have stated above—that sub-plane 7_7 existed before matter had any chemical affinity.

Nothing compels us to reject this statement, and it is thus easier to think that sub-planes 7_1 , 7_2 , 7_3 represent respectively the three states of matter which we call solid, liquid and gaseous, and that the three "elements" of the ancients—"earth", "water", "air"—correspond to matter in these sub-planes. The easiest way of passing from one to another of these sub-planes is by using heat, for a rise of temperature brings about the transformation.

Now if a gas were sufficiently heated, it would become ionized and, as we have seen, have different properties. To this ionized state, which was then barely known, Crookes gave the name of "radiant" state, and this would correspond to

Radiant State
of Matter

sub-plane 7₄. It is worth noting that this sub-plane corresponds to the element of "fire", and that gases present in flames are in a strongly ionized condition.

We may state that scientific knowledge as to the presence of ionized matter in the stars is only a few years old. Now in October 1882, the Master K. H., writing to Mr. Hume on the subject of the coronal line (that is, the line in the spectrum of the sun's corona which was adjacent to, but not identical with, one of the lines of the iron spectrum), said :

The coronal line may not *seem* identical through the best "grating spectroscope, nevertheless, the *corona* contains iron as well as other vapours. To tell you of what it does consist is idle, since I am unable to translate the words we use for it, and that *no such matter exists (not in our planetary system, at any rate)—but in the sun.* [The italics are ours, and show the rigorous truth of these last lines—a truth which at the time no western scientist was in a position to state.]

We have spoken above of the case when the atomic nuclei might be deprived of all their electrons, and have indicated that the properties of such matter would be surprising. Not only would such matter probably give out no light, even at high temperatures, but its density would be enormous, comparable in fact with that of the dark companion of Sirius, a litre of which matter has a mass of more than sixty tons.

One is tempted to consider this as a fifth state of matter. But this does not seem to us justifiable. The atomic nuclei including that of hydrogen or proton, are ionized atoms. On the other hand, neutrons are not in this class. They are the only neutral element in the atomic nuclei. Having no chemical affinity, neutrons pass very easily through the nuclei bringing about transmutations among them. If brought together in large numbers, they would form matter of an incredible density, as one cubic centimetre might have a mass of 10^8 tons. And yet such matter would be a gas of which the particles would be without any action one on the other except the repulsions due to their mutual collisions. Moreover, it would be impossible to keep such a gas in any container; the neutrons having no electric charge would pass through matter without any difficulty. They are only checked when meeting nuclei, a rare event, as in a dense solid like gold, the nuclei only occupy 10^{-15} of the volume of the atom. For neutrons all matter is pervious, in the same way as a thin fog might be. This being so, it seems

to us that the neutron might be taken as representing matter of the third sub-plane of the physical plane. We have yet to find a home for the electrons, both positive and negative. They are mere electric charges and quite different from any matter so far discussed. They might be placed as belonging to the second sub-plane, 7_2 . Some authors have considered them as 7_1 , but if so, we should have to consider the ionized state as belonging to 7_2 and 7_3 .

The above ascriptions are only suggested as hypotheses for future work by theosophical observers.

THE ATOMS OF THE PHYSICIST AND CHEMIST

It has been stated above that we cannot draw the atom. But we can measure the properties of atoms, classify them and decide to which part of the atom any property is due. Thus all spectroscopic and chemical properties of the atom are due to its atmosphere of electrons. As to the number of electrons and their arrangement, these depend on the electric charge of the nucleus. On its *charge* and *not on its mass*; and so we can have two atoms with the same electric charge, and therefore atoms of the same chemical element, but with different masses. Such atoms are *isotopes*. The mass of an atom and its stability depend directly and solely on its nucleus.

If one places the atoms in order of the increasing electric charge of the nucleus (which is nearly the same order as that of the increasing mass), one notices a very clear periodicity in nearly all the chemical and physical properties of the atoms. In considering more especially the chemical properties, one arrives at the celebrated Periodic Law of the Elements. Each atom is therein defined by the properties of its outer electrons and by their total number.

The atoms having similar chemical properties will appear in the diagram of this Law in the same vertical column, and one can express this fact by imagining that the structures of their electrons form structures of the same type. The latter statement is not an experimental fact, but a simple and useful hypothesis to indicate similarities of properties which are known facts.

In each atom the following are measurable :

- (a) the number of electrons ;

(b) the varying amounts of energy required to dissociate these electrons;

(c) the mass of the nucleus.

If we limit ourselves to the stable and non-radioactive atoms, then a knowledge of (a) and (c) above is sufficient to determine the atom completely. That is why any attempt to explain the theosophical observations of atoms will have to explain these results in terms of these two fundamental numbers of an atom.

THE ATOMS OF THE CLAIRVOYANT

Annie Besant and C. W. Leadbeater began their observations of atoms in 1895, then, after a break, continued them in 1905, and again in 1909.¹ A few isolated researches, such as the structure of molecules and of solid bodies, have appeared since as articles in the pages of *The Theosophist*. We will not refer to these.

The two observers were neither chemists nor physicists. They limited themselves to describing and drawing what they observed. Then they tried to give to each drawing the name of the chemical element to which it corresponded.

At the time when the greater part of this research work was done—1905—the general scientific opinion was that each chemical element was defined by a single atomic weight (the existence of isotopes not being known) which was very approximately an integral multiple of the atomic weight of hydrogen.

Consequently, the first object of the observers was to see if the atoms were built up of hydrogen atoms. This was found not to be so. Neither directly nor indirectly were the atoms which they examined built of atoms or nuclei of hydrogen. Moreover, the structures they observed contained nothing which could be compared to the nuclei of physical atoms or to their electrons. Under these conditions it might be considered rash to try and find the atomic weights of these bodies. This however is just what was done.

All the atoms observed were made up of tiny bodies of two types, symmetrical to one another, which the observers called *ultimate physical atoms*, and stated them to be matter of the first sub-plane, 7₁. As the hydrogen atom contained eighteen of these ultimate atoms, the observers

¹ Observations were carried on as circumstances permitted till 1932.—Ed.

proceeded by counting the number of these ultimate atoms in each atom to be identified, then divided the total number by eighteen, and then the number thus obtained was compared with the chemical atomic weight of the atom. The agreement was good and remarkable, although not perfect. We must at once state that this method pre-supposes that the ultimate physical atoms had mass, that they all had the same mass, and that this mass did not vary when they were united to form complex bodies.

The observers had then two methods of classification available :

(a) the numbers obtained as indicated above, which were the numerical weights of the atoms ;

(b) the whole shape of the atoms.

Except for a certain number of important and light atoms (hydrogen, helium, nitrogen, oxygen, fluorine) the shapes of which were unique, the observers were able to distinguish seven types of shapes : stars, points, dumb-bells, tetrahedra, cubes, octahedra and bars. With the help of this classification and that of the numerical weights, the observers obtained the well-known periodic classification (see fig. 8).

But this classification was not exact, there were a few extra elements. For example—for neon, there were two atoms of different numerical weights, but of the same shape. In 1912 it was discovered by scientists that there were two kinds of neon, having atoms of very nearly the same mass as the numerical weights indicated by these theosophical observers.

The same thing happened in the case of other gases of the argon family ; but at the present moment scientists know of a greater number of isotopes than those seen by these theosophists. It is moreover fairly easy to name the greater number of the atoms they observed.

It is most interesting to state that the theosophists indicated, without being able to name, a group of three very similar atoms with numerical weights between 148 and 151, which seemed analogous to the well-known triplets—iron, cobalt, nickel ; ruthenium, rhodium, palladium ; osmium, iridium, platinum. It is very likely that these three bodies are isotopes of samarium. In the same way, at the other end of this series of atoms, those called " rare earths ", it is most likely that the atoms analogous to xenon are isotopes of ytterbium.

Theosophical observers thus revealed the existence of the ionized state and of isotopes before the physicists did so. If the matter was not

pursued further, it was because of an insufficient number of competent observers.¹

DIAGRAM OF THE PERIODIC LAW

0 Star	1 Point or Dumb- bell	2 Tetra- hedron	3 Cube	4 Octa- hedron	5 Cube	6 Tetra- hedron	7 Point or Dumb- bell	8 Bar
							H	
He	Li	Be	B	C	N	O	F	
Ne	Na	Mg	Al	Si	P	S	Cl	
A	K	Ca	Sc	Ti	V	Cr	Mn	Fe Co Ni
	Cu	Zn	Ga	Ge	As	Se	Br	
Kr	Rb	Sr	Y	Zr	Nb	Mo	Ma	Ru Rh Pd
	Aj	Cd	In	Sn	Sb	Te	I	
Xe	Cs	Ba	La	Ce	Pr	Nd	?	
	Sm	Eu	Gd	Tb	Dy	Ho	Er	
	Tu	Yt	Lu	Ct	Ta	W	Re	Os Ir Pt
	Au	Hg	Tl	Pb	Bi	Po	Ml	
Em	?	Ra	Ac	Th	Pa	U	?	

FIG. 8

The first line gives the number of each column. The second line gives the type of "shape" seen by clairvoyance. Notice the irregularity due to the "rare earths" (from La to Lu within the two thick lines).

HYPOTHESES

We have said that in the drawing representing the theosophical observations, there was nothing to indicate the nucleus and its surrounding electrons. Now we know that both of these exist in the atom. They exist, but they are of very different dimensions. The atomic nucleus has a diameter a thousand times smaller than the distance which separates it from its nearest electron. Thus we may suggest that the bodies seen

¹ A Note on Occult Chemistry giving further particulars from another angle will be found further on in this Part—ED.

by the theosophical observers were the atomic nuclei and not the complete atoms themselves.¹

We must remember that according to recent developments of physics, that is, wave-mechanics, the electrons have no individual existence inside the atom, their electrical charges being melted in a "field" which is a complex of waves. Theosophical observers have insisted on the pulsating appearance of the atoms.

PRACTICAL CONCLUSION

Every one after reading this comparison of the scientific and theosophical results of studying the atom will draw his own conclusions. We wish simply to stress the great importance of making clairvoyant observations of the following :

- (a) The scientific names of the sub-planes ; the structure of the solid state, of the liquid state and of the molecules.
- (b) The difference between the atom of hydrogen and the proton.
- (c) The appearance of the electron.
- (d) The study of the atoms belonging to "rare earths".
- (e) The study of the atoms which have no isotopes.

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¹ It may be noted in connection with this suggestion that the data collected by the theosophical observers were those obtained by actually seeing the inner working of the phenomena in their *normal* condition and not by the observation of their external behaviour under excited conditions of experiment, as is done by science. (See p. 2, Part I, and *A Note on Occult Chemistry*, this Part.—Ed.)

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CHEMISTRY ¹

BY D. D. KANGA

There is but one science that can henceforth direct modern research into the one path which will lead to the discovery of the whole, hitherto Occult, truth, and it is the youngest of all—Chemistry, as it now stands re-formed. There is no other, not excluding Astronomy, that can so unerringly guide scientific intuition, as can Chemistry.²

Chemistry and Physiology are the two great magicians of the future, which are destined to open the eyes of mankind to great physical truths.³

THESE general statements about the value and importance of chemistry given in the classical Theosophical literature have been amply verified, for it is from this branch of science that has come the new view of the nature of matter.

As the title of this Series indicates, the objective kept in view in writing this monograph is to show where and how far
Aim Theosophy and Chemistry meet.

Chemistry is the science which deals with *all* forms and kinds of matter and their transformations one into another. The
Scope of Chemistry air we breathe, the water we drink, the different kinds of food we eat, the clothes with which we cover our bodies, the houses in which we live, the soil on which we tread, all the kingdoms of nature, mineral, vegetable, animal and human—in a word, every substance that we can think of, from star to atom—each forms a proper object of study in the science of chemistry. The whole universe is built up of one or another type of matter, and when we consider that there is nothing on earth or in the heavens which has not a material basis, we are struck by the almost infinite scope of chemistry and its innumerable

¹ This monograph, the one preceding it and the three Notes following it may all be read together as they are all connected.—ED.

² S.D., I, 635.

³ S.D., I, 281.

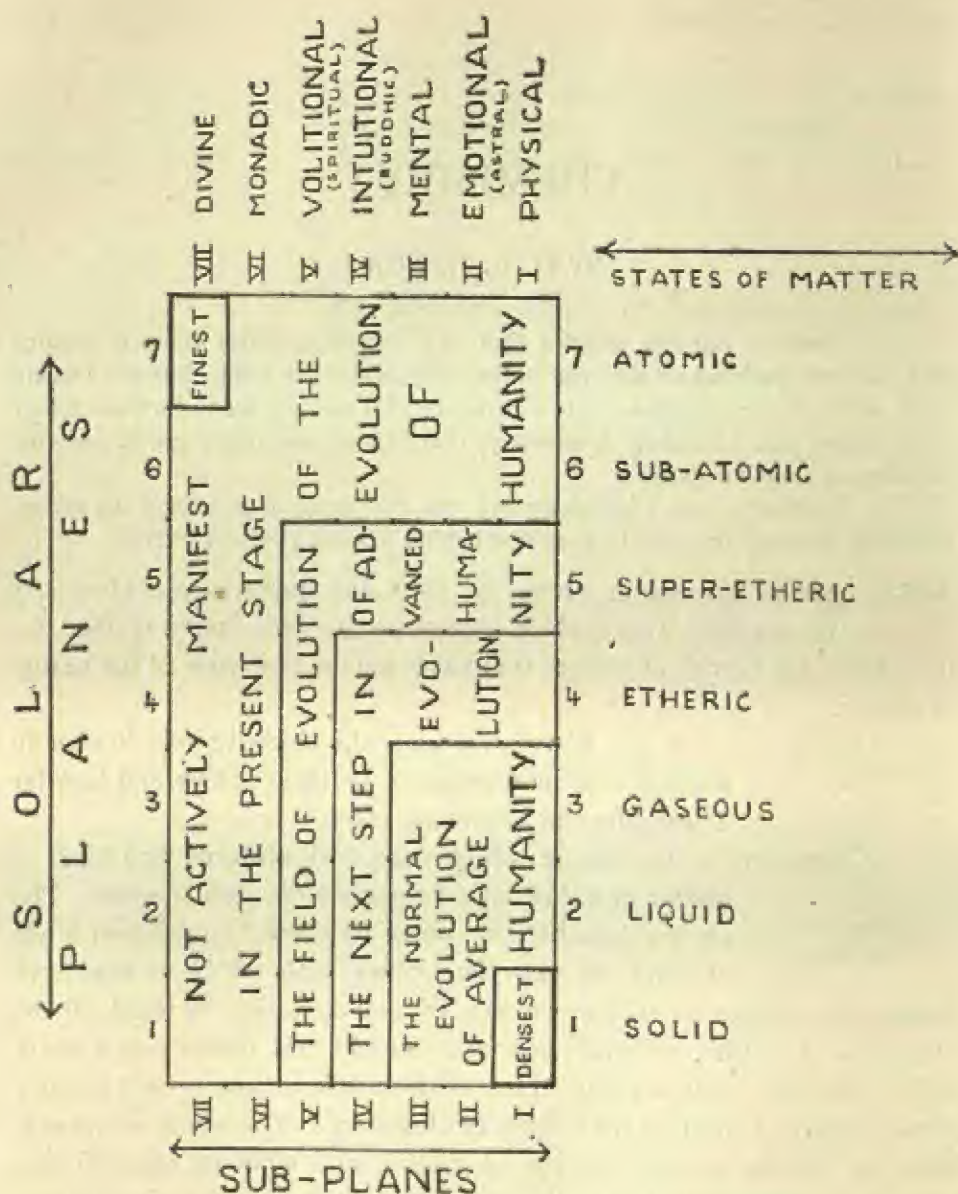


DIAGRAM 1

ramifications affecting all branches of science and philosophy. Though this view regarding the scope of Chemistry appears to be extensive and far-reaching, yet it sinks into insignificance when we compare it with the view of the nature of matter taken by Theosophy. Both deal with the foundation-stones of the universe, but how differently! In order to understand the full significance of this statement, we will first give the viewpoint of Theosophy as regards matter and then point out where and how far the two meet.

Theosophy tells us that the universe is based on a septenary system.

Theosophical View
of the Origin and
Creation of Matter¹

The rationale of this will be explained later. (vide infra). Diagrams 2, 3 and 10 show cosmic and solar planes² of matter. There are seven planes of matter.

They are called the physical, the astral (emotional), the mental, the intuitional (buddhic), the spiritual (atmic or volitional), the monadic and the divine.

The names of the planes are very significant for they show the sequence of phases of consciousness which are possible to man. They also show the psychological phases of human evolution. This being the case it is impossible, in our discussion, to separate Man from the Atom or the Universe. On three of these planes, the physical (the plane of action), the astral (the plane of emotions), and the mental (the plane of thought), is proceeding the normal evolution of average humanity. The field of evolution of advanced humanity would include the next two higher planes also (the planes of intuition and will). The remaining two uppermost planes (the monadic and the divine) are not actively manifest in the present stage of the evolution of humanity. (vide diagram 1). The diagram also indicates that the planes of consciousness and of matter are always linked together. It also shows the constitution of man which is analogous to that of the solar system.

¹ For the help received in writing the short sketch given here on the "Theosophical View of the Origin and Creation of Matter", the writer is indebted to the classic theosophical literature. He has made free use of the information given in C. Jinarājadāsa's *First Principles of Theosophy*, particularly Chap. VIII (T.P.H., Adyar), Annie Besant's *A Study in Consciousness*, Introduction and Chap. I, (T.P.H., Adyar), *Occult Chemistry*, by Annie Besant and C. W. Leadbeater and *The Chakras*, by C. W. Leadbeater, for which he tenders his grateful acknowledgments both to the authors and the publishers. For an exhaustive account of this subject the reader is referred to Madame Blavatsky's *The Secret Doctrine*, Vol. I, which deals with the question of Cosmogonies.

² "Planes" are really spheres entirely surrounding the physical globe, but as all Occultists understand the word, "plane" simply signifies a condition of matter". (P. 4, *Occult Chemistry*, by Annie Besant and C. W. Leadbeater).

SUB-PLANES

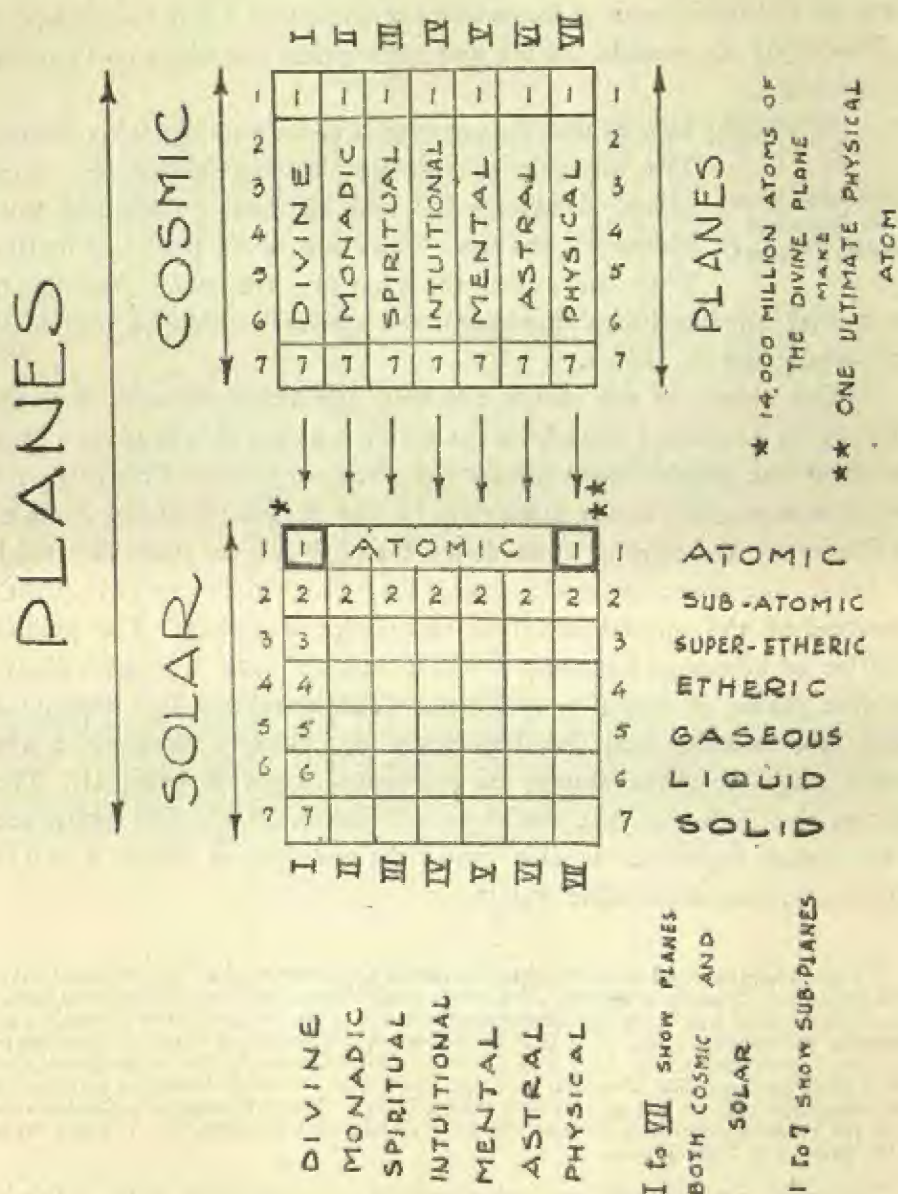


DIAGRAM 2

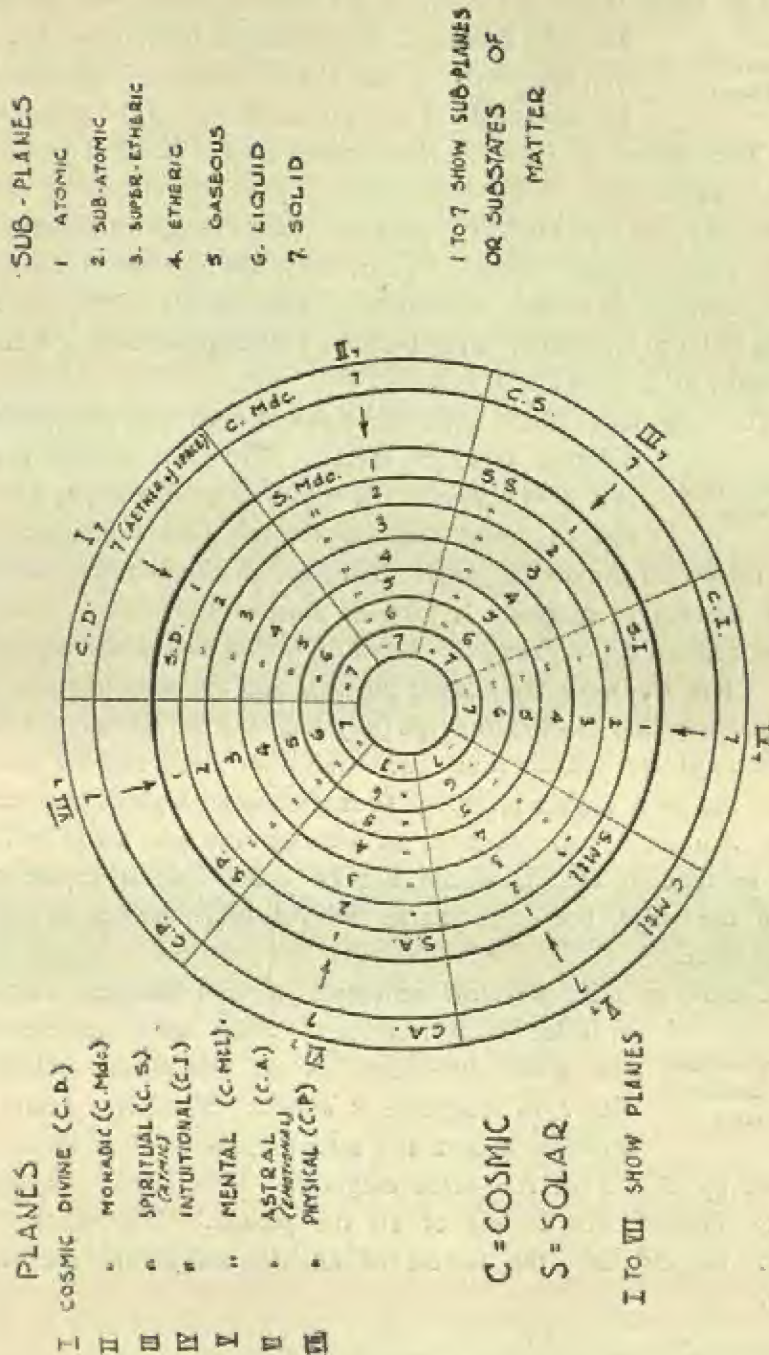


DIAGRAM 3

The lowest plane is the Physical Plane with which we are familiar and which is the field of study of modern science. The highest plane is the Divine Plane. The other planes are intermediate between these two as the diagrams will show. The matter of each of these planes is of a different type. Each plane has again seven sub-planes, according to the fineness of matter of each sub-plane as indicated by their names; for example, the highest sub-plane is called atomic (finest matter) and the lowest is called solid, (densest matter), of course relatively. (vide infra). They are in the following order: (1) Atomic,¹ (2) Sub-atomic, (3) Super-etheric, (4) Etheric,² (5) Gaseous, (6) Liquid and (7) Solid.

The sub-planes show different *states* of matter as the planes show different *types* of matter. Thus the densest matter in the solar planes is the solid matter of the physical plane and the most tenuous matter of the solar planes is the atomic matter of the divine plane. They are shown in thick lines in two opposite corners in diagram 1, labelled *densest* and *finest*. Another interesting feature in diagrams 2, 3 and 10 is that the planes repeat themselves. Thus we have the cosmic physical and the solar physical planes. Both contain matter of the same *type* (physical) but the matter of the cosmic plane shows greater tenuity than that of the solar plane, like the same notes in music but of a higher pitch. The matter of each plane and sub-plane becomes more and more tenuous as we rise from one lower to the next higher, so tenuous that it would not be called matter in the ordinary sense of the word, but it is matter all the same, matter in the super-sensuous state.

Cosmic or solar *physical* universes are not identical with cosmic or solar *solid* universes. Solar solid universe means the solid sub-states of all the planes indicated by No. 7 in diagrams 2 and 3. Similarly, solar atomic universe means the atomic sub-states of all the planes indicated by No. 1 in the same diagrams. The word "physical" is used to indicate the lowest of all the *planes*. The word "solid" is used to indicate the lowest of all the *sub-planes* (or states of matter).

¹ This is not the atom of science.—ED.

² This is not the Aether of Space; it only shows a sub-state of matter.—ED.

Now *the lowest sub-planes* of the seven cosmic planes form the field of work for *all* the Solar Logoi (vide infra). *Our* Solar Logos also uses a portion of matter of these lowest sub-planes (marked No. 7) of all the seven cosmic planes for His Scheme of Evolution as shown in diagrams 2 and 3. Roman numbers are used for Planes and Arabic numbers for Sub-planes. The lowest or 7th sub-planes alone of all the seven cosmic planes I to VII are represented in the outermost circle of diagram 3. From these lowest sub-planes (marked 7) of all the cosmic planes, are formed the solar planes (I to VII). (Diagrams 2 & 3). Now every plane has its atomic (marked 1) and molecular (marked 2 to 7) states of matter which have a sympathetic vibratory rate, not only with other atoms and molecules, but also with the great planes, of like number. For example :

1. When the vibratory rate of the matter of sub-plane (7) of the physical plane (VII) is struck, there are overtones of harmonic response not only from (7) molecular of every solar (and cosmic) plane but also the whole solar physical plane (VII). Or,

2. If one can sound the mental atom (1) of the solar mental plane (V), one can awaken the corresponding state of matter on the Cosmic or Archetypal Mental World (V). (See Diagram 10). Raising one's consciousness in meditation to the mental atomic plane, it may be possible for one to get a slight glimpse of the Plan of the Logos.

Another important feature to note is that the planes are *interpenetrating*. We use the words "higher" or "lower" planes, but it should be remembered that they have no reference to space, for *all planes are here* in nature and within and outside of us. They only mean a difference in the type and fineness of matter of each plane. "Planes" are really spheres surrounding and penetrating the physical globe. These words are merely used for the sake of convenience to explain the diagrams on paper. Diagrams 4 and 5 show the penetrating power of matter. The matter of one plane can penetrate the matter of a plane lower (coarser) than its own, but not that of a plane higher (finer) than its own. This means that the matter of the highest (finest) divine plane can penetrate the matter of all planes. The matter of the lowest (coarsest or densest) physical plane cannot penetrate the matter of any of the higher planes but is being penetrated by the matter of all planes above it.

1. Divine
2. Monadic
3. Spiritual
4. Intuitional
5. Mental
6. Astral
7. Physical

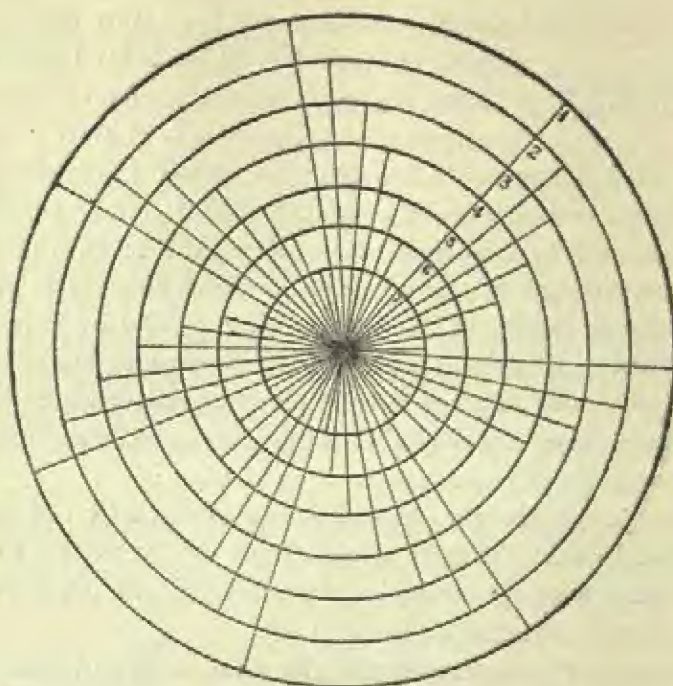


DIAGRAM 4

This diagram shows the penetrating power of matter. It shows the seven planes of matter from the physical to the divine. The matter of the divine plane being the finest is shown penetrating the coarser matter of all the lower planes. The matter of the physical plane being the densest is shown as being penetrated by the finer matter of all the higher planes.

In diagram 5 the physical plane (coarsest or densest) is shown on the outside and the divine plane (finest or subtlest) in white colour, as penetrating all other planes from the centre outwards. As regarding the numbering of the planes, two different principles are followed. When the scientific method of going from the known to the unknown, from the physical to the higher planes of matter is followed, then the physical is called No. 1, the astral No. II and so on to the divine which is called No. VII. On the other hand, when we start from the One Divine Life and trace its multiplication outwards then the divine is called No. 1 and the physical No. VII.

In diagram 5, man (the microcosm) is represented as clothed in matters of all the planes and seems to appear as a flower. When one looks at the white portion in the diagram from a distance, a floral design emerges in view.

Diagrams 2, 3, 4 and 5 bring out the fact that matter of all the seven planes is there everywhere, in *man* and the *universe*, the finer

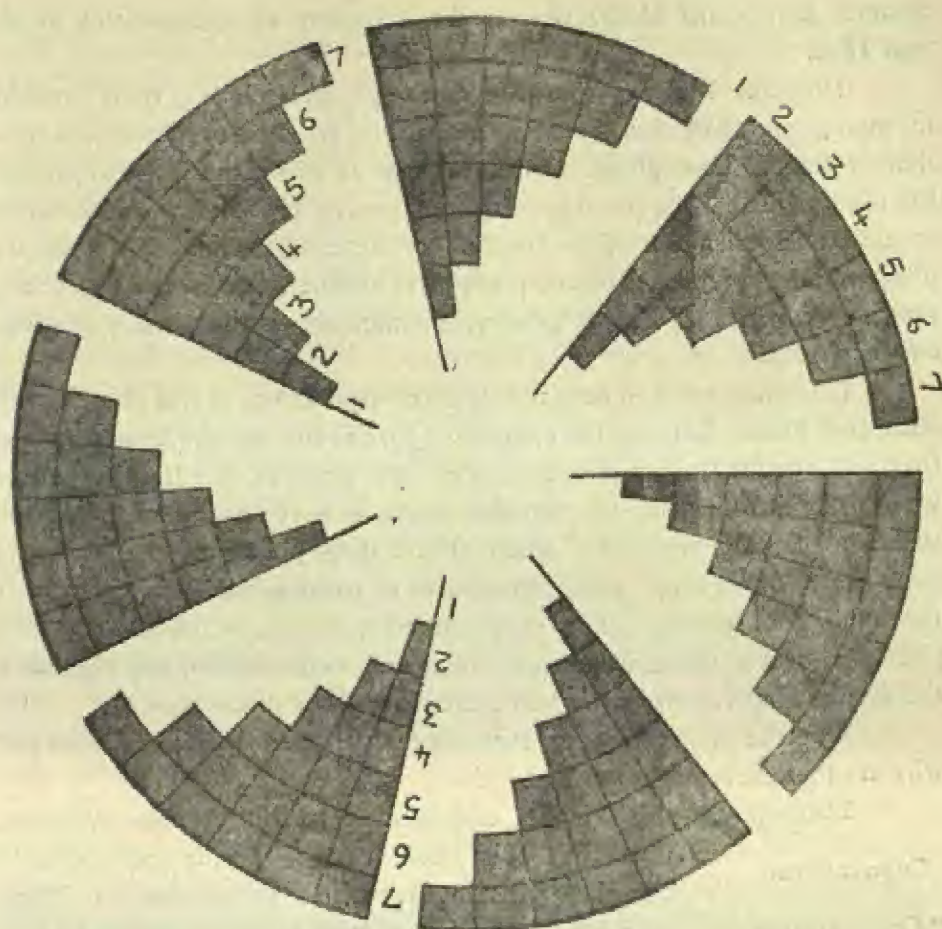


DIAGRAM 5
MAN, THE MICROCOSM, AS A FLOWER

always penetrating the denser, the densest (physical) being penetrated by all.

"It is important to remember that the planes are interpenetrating, and that corresponding sub-planes (see diagram 2) are directly related to each other, and are not really separated from each other by intervening layers of denser matter . . . it implies that life can pass from plane to plane by the short road of the communicating atomic sub-planes".¹

In connection with the penetrating power of matter through matter it is interesting to note that this property of matter was not known to

¹ *A Study in Consciousness*, by Annie Besant, pp. 26-28.

modern science till Henri Becquerel's discovery of radioactivity in the year 1896.

Diagram 4 shows that life on the physical plane is most involved in matter and has, for the same reason, its freedom of locomotion most limited there. Though at a disadvantage in this respect, life enjoys, on the physical plane, the privilege of having greater precision and definiteness in all its experiences. This freedom of locomotion increases with the disappearance of matter of one plane after another, that is, the degree and range of freedom of life are greater, for example, on the astral plane than on the physical.

It is interesting to note the close correspondence of this phenomenon with the Phase Rule of the chemist. Just as life has the least degree of freedom when it is clothed in matter of all the planes, and that is the case when it is working on the physical plane, so is the degree of freedom in the case of water the least when all its three phases are present at the same time, or, in other words, the degree of freedom varies inversely with the number of phases. The range of temperature, when all the three phases of water (solid ice, liquid water and water vapour) are present, is the smallest but it is largest when there is only one phase present.

What is the nature of this matter¹ where does it come from and why are there seven types of matter?

Theosophy, which is an embodiment of the Ancient Wisdom, tells us that the whole cosmos is the expression of a Conscious Intelligent Life. It is ever a Unity, "One without a second". This great Reality is also expressed as the "Boundless Space of the Divine Plenum". When manifestation takes place, there is a differentiation and Spirit-Matter or Life-Form appears *simultaneously*. We may imagine the Cosmic Logos emerging from the "Boundless Space of the Divine Plenum" as ice separating from water, or as a bubble appearing under water.

Associated with the work in the Universe of the Cosmic Logos are seven embodiments of His Nature, called the Seven Cosmic Planetary Logoi. All the stars in the universe, which are centres of great evolutionary systems, belong to one or other of these great Seven, and are in some way expressions of Their life, as They in turn are expressions of the One Life of the Cosmic Logos. . . . In all this vast splendour of universal life, exists the Lord of our Solar System, the Solar Logos. As a Star, as the Lord of a System among

¹ Read the section on "the Nature of Matter" in the Monograph on "Relativity" in this Part to have a comprehensive view of the subject.—Ed.

the myriads of stars, He lives and moves and has His Being in His Father-Star, one of the great Seven; yet He mirrors directly the Life and Light and Glory of the "One without a second".¹

The field of activity of our Solar Logos is "a sphere, whose radius begins with the sun and ends with the last satellite of the farthestmost planet yet to be discovered".²

Associated with the work of the Solar Logos are the seven Planetary Logoi, who are seven embodiments of His Nature. (*Vide* diagram 6.) Diagram 7 brings out the intimate constitutional relationship between man and the external universe. It also illustrates the occult law, "As above, so below". The physical is the reflection of the spiritual.

Now, what is the nature of the substance or substances which fill all space according to theosophical conception? Theosophical investigators have named this substance, which fills what we are in the habit of calling empty space, *Koilon*.

"What *mūlaprakṛti*, or 'mother-matter', is to the inconceivable totality of universes, *koilon* is to our particular universe—not to our solar system merely but to the vast unit which includes all visible suns. Between *koilon* and *mūlaprakṛti*, there must be various stages, but we have at present no direct means of estimating their number or of knowing anything whatever about them".³

"In an ancient occult treatise, however, we read of a 'colourless spiritual fluid' which exists everywhere and forms the first foundation on which our solar system is built. Outside the latter, it is found in its pristine purity only between the stars [suns] of the universe. . . . As its substance is of a different kind from that known on earth, the inhabitants of the latter, seeing *through it*, believe, in their illusion and ignorance, that it is empty space. There is not one finger's breadth of void space in the whole boundless universe. '*The mother-substance*' is said, in this treatise, to produce this æther of space as its seventh grade of density, and all objective suns are said to have this for their 'substance'".⁴ (*Vide supra*) (see diagrams 2 and 3, and 6 and 7). (*Italics are ours*).

"To any power of sight which we [Annie Besant and C. W. Leadbeater] can bring to bear upon it, this *koilon* appears to be homogeneous,

¹ F.P.T., p. 189.

² F.P.T., p. 191.

³ O.C., appendix, i. See also, diagram 6.

⁴ *Ibid.*, i and ii.

though it is probably nothing of the kind, since homogeneity can belong to the mother substance alone. It is out of all proportion denser¹ than any other substance known to us, infinitely denser—if we may be

pardoned the expression ; so much denser that it seems to belong to another type, or order, of density. But

What is the Nature
of Koilon ?

now comes the startling part of the investigation : we might expect matter to be a densification of this koilon ; it is nothing of the kind. Matter is not koilon, but *the absence of*

What is the Nature
of Matter ?

Koilon, and at first sight, matter and space appear to have changed places, and emptiness has become solidity, solidity has become emptiness".²

According to the plan the Logos has thought out for the purpose of evolving a universe, He draws round Himself the necessary matter

Building of
Universes

from space and ensouls it with His own life (breath). For each system the matter of space around it is its root-matter. The life of the Logos within this matter is the spirit in every particle. It cannot be better expressed than in the words of H. P. Blavatsky who says, "Fohat digs holes in space".

Fohat is the energy of the Logos. The substance filling the so-called empty space is the koilon. It is this energy which blows bubbles in a substance of infinite density. These bubbles found in the koilon are not like bubbles floating in the air, but are like bubbles arising in water before they reach the surface. Just as the wall of the latter is the water, which is pushed back by the contained air, so is the wall of the former, the koilon, pushed back by the energy of the Logos. It is these 'airy nothingnesses, the bubbles, of which "solid universes" are built'.³ These are primordial atoms of our solar system.

"The Breath of the Logos, then, is the force which fills these spaces ; His the force which holds them open against the tremendous pressure of the koilon ; they are full of His Life, of Himself, and everything we call matter, on however high or low a plane, is instinct with divinity ; these units of force, of life, the bricks with which He builds His universe, are His very life scattered through space". . . . "Scientists may call this 'Force' by

Foundations of
the Universe

¹ See *The Density of Aether*, by Sir Oliver Lodge : "The densest matter known is trivial and gossamer-like compared with the unmodified æther in the same space".—Lodge. Quoted from *Occult Chemistry*, Appendix, vii.

² O.C., appendix, ii.

³ O.C., appendix, v.

what name they will—names are nothing; to us, Theosophists, it is the breath of the Logos".¹ When He breathes into the "waters of space", universes come into existence; when He draws in His breath, the waters of space close in again and universes disappear.

"The outbreathing which makes these bubbles is quite distinct from, and long antecedent to, the three outpourings, or Life-Waves so familiar to the theosophical student (*vide infra*). The first Life-Wave [Third Logos] catches up these bubbles, and whirls them into the various arrangements² which we call the atoms of the several planes, and aggregates them into the molecules, and on the physical plane into the chemical elements. The worlds are built out of these voids, these emptinesses, which seem to us 'nothing' but are divine force. It is matter made from the privation of matter. How true were H.P.B.'s statements in the *Secret Doctrine*: 'Matter is nothing but an aggregation of atomic forces (iii, 398)'"³

"Sir Oliver Lodge makes a striking estimate of the intrinsic energy of the æther in his pamphlet on "The Density of
The Nature of the
Force which fills
Space
 Æther: He says: 'The total output of a million-kilowatt power station for thirty million years exists permanently, and at present inaccessible in every cubic millimetre of space'. Here again he is probably underestimating the stupendous truth"⁴

In the light of what has gone before, we shall now be in a position to understand what tremendous and terrific forces are locked up in the atoms. We are living in an atomic age and we have had some knowledge of how disruptive this energy locked up in an atom *bomb* could be and what a blessing again it would be if the same atomic energy, when controlled, is used for constructive purposes.

So these bubbles in the koilon are the primordial atoms of our solar system. Fourteen thousand millions of them (49⁶) go to form an ultimate physical atom.⁵ The ultimate physical atoms are of two types, one positive and the other negative (diagram 8). A glance at the diagram will show that they are all alike in every respect except the direction of

¹ O.C., appendix, v.

² See. "A Note on Occult Chemistry", this Part.—ED.

³ O.C., appendix, vi.

⁴ *Ibid.*, viii.

⁵ See diagram 2.

the whorls and of the force pouring through them. The whorls are ten in number; they do not touch each other, but coil themselves into parallel series, the three thicker ones forming a caduceus-like form (diagram 8) with the seven finer ones. Ultimately it is the different kinds of energy of the Logos which whirls them into the different spiral formations.

The Third Logos¹ (the third aspect of the Logos) has a triple function which He uses in the formation of the atom.

The Formation of the Atom First, He fixes the limit within which His life shall vibrate in the atom. This determines the wave-length of the vibration which is technically called "the divine measure". This gives to the atoms of a plane their distinctive characteristic. Secondly, He determines the fundamental axes of growth and their angular relations with each other, which determine the form of the atom. Finally, He determines the size and form of the surface or wall of the atom. Thus, in every atom we find the measure of its ensouling life, its axes of growth and its enclosing wall. (Diagram 7.)

The three thicker spiral formations result from the direct activity of the Logos, and the seven finer ones indirectly through His seven embodiments, the seven Planetary Logoi. Electricity is the expression of the force of the Third Logos on the physical plane. (Diagram 7.)

Thus, we see that our physical atom is a most wonderful thing we can conceive of; it is the seat of so many forces and the meeting-place of matter of all the planes (diagrams 2, 3, 4, 5, 7 and 8.)

So far we have spoken about the activity of the Third Logos only.

The Formation of Mineral, Vegetable and Animal Kingdoms We will now turn our attention to the work of the Second Logos. He ensouls the matter of all the seven planes, shapes it into forms and endows them with the mysterious quality of *life*.² The forms persist so long as the life of the Second Logos is there. Under His influence and guidance the mineral, vegetable and animal kingdoms, and the savage, mindless man come into being in succession—all the kingdoms, except the human. (Diagram 7.)

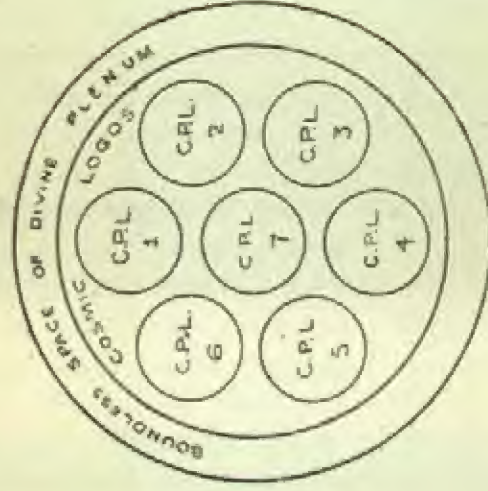
The chemical elements combine under His action into innumerable compounds and produce the matter of the physical world as we see it

¹ The First Logos, the Second Logos and the Third Logos mean the first, second and third aspects of the Logos.

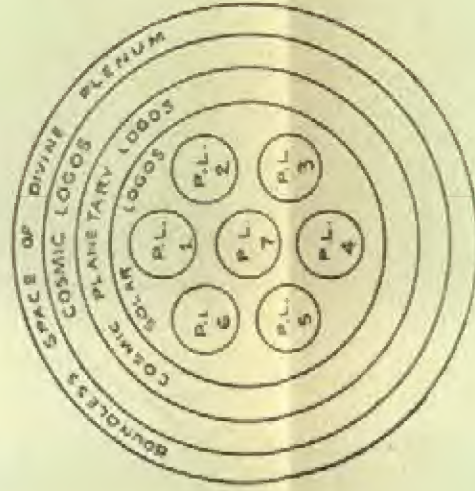
² This life is of a higher type than what is found in the atoms mentioned above.

BOUNDLESS SPACE OF DIVINE PLENUM

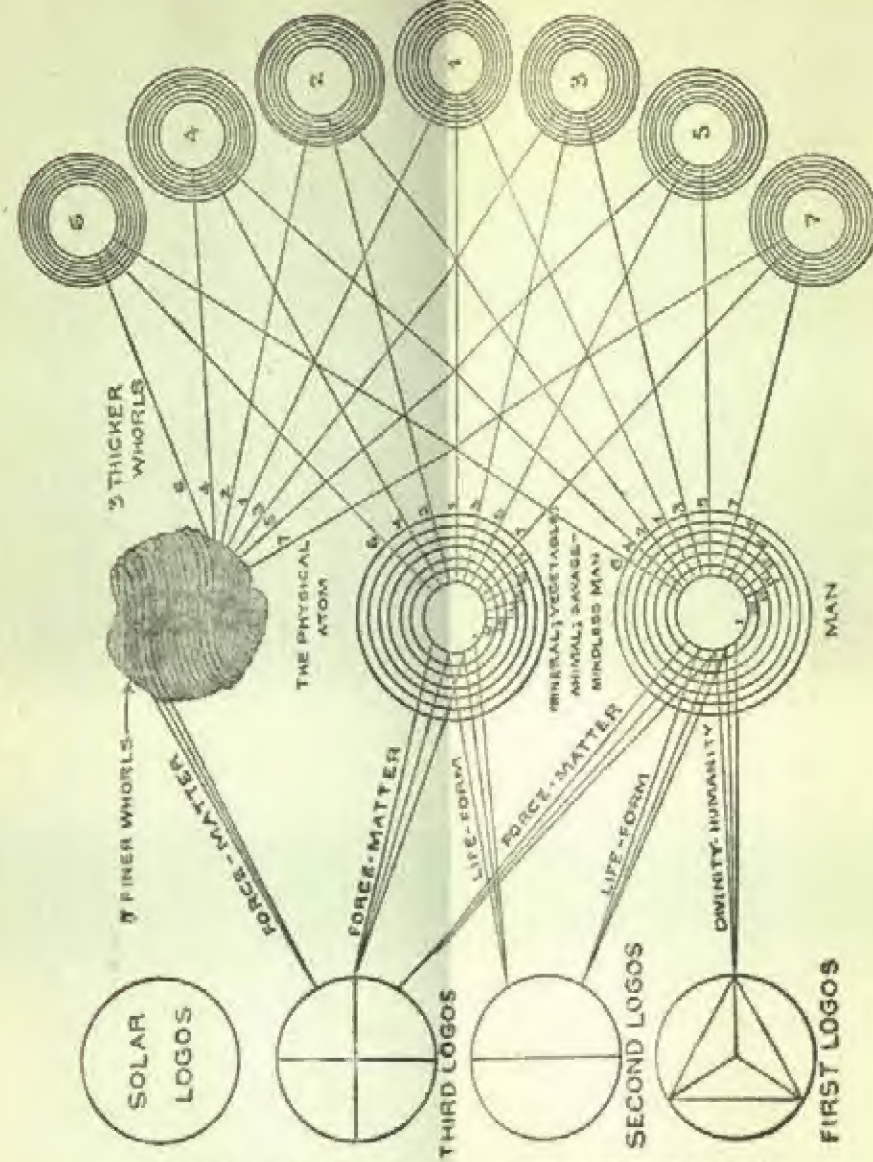
MŪLAPRAKṚTĪ
OR
"MOTHER-MATTER"
(HOMOGENEFOUS)



C. P. L.-COSMIC
PLANETARY LOGOS
KOILON
(ATOMIC)



SOLAR LOGOS

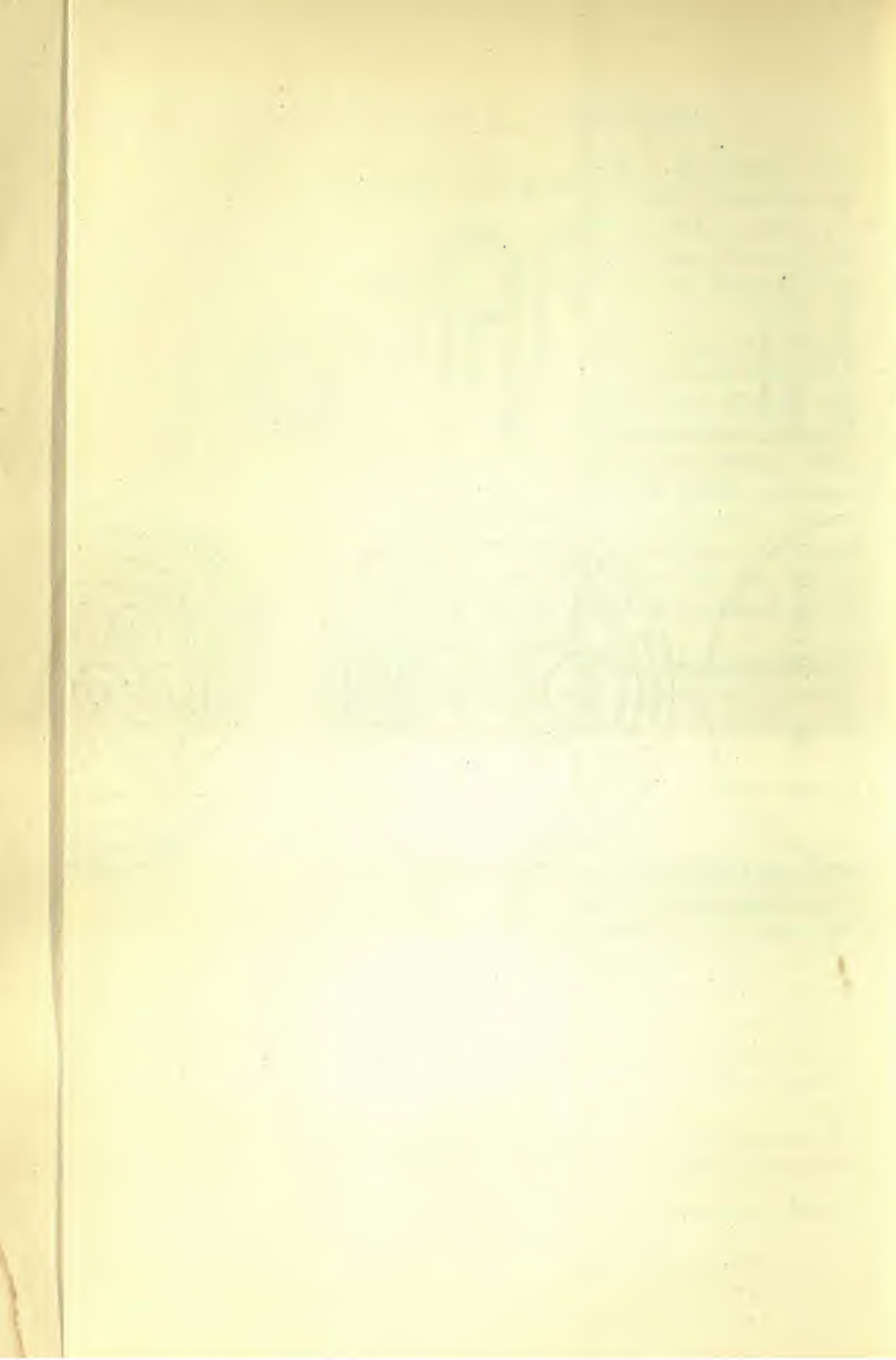


SOLAR PLANETARY LOGOI

Diagram 6 shows the emergence of the Solar Logos from the "Boundless Space of the Divine Plenum" through the Cosmic Logos and one of the seven Cosmic Planetary Logoi.

Diagram 7 shows the functions of the three aspects of the Solar Logos and of the seven Planetary Logoi in the creation of the atom, the mineral, vegetable and animal kingdoms, the savage "mindless" man, and man. It also shows their structure and constitution. It, again, brings out the intimate relationship between man and the external universe.

See "Note on Astrology", Part IV of this Series. Diagram 7 gives an insight into the inter-relationship between the heavenly bodies and man.



today. The beautiful and symmetrical minerals and crystals are the result of His work. Here, in the mineral kingdom we see the truth of the two statements so often quoted, namely, "God geometrizes", and God "dead and buried", crucified on a cross of matter. We have already seen the truth of the first statement in the mathematical precision with which matter crystallizes and makes beautiful forms of seven different types, the seven crystalline systems.

"Minerals, again, experience fatigue, or exhaustion of vital energy by work, and regain elasticity by repose, and they also show preferences and aversions, which are all very elementary germinal sensations . . . the chief signs of the imprisoned life being the attraction exerted by all masses of matter, adhesion, cohesion, magnetic affinity, attraction and repulsion".

In the mineral kingdom again we see His life descending into the densest matter, for there is no matter denser than the physical solid. The degree of freedom of the life ensouling the mineral form is the least. Here it is most involved in matter. This is also its turning-point, for as it passes from the mineral into the vegetable and then into the animal kingdom, life gradually begins to ascend, evolution follows involution, and its degree of freedom becomes more.¹ We see the expression of this law everywhere. The chemical elements are endowed, by His life, with the power of building up protoplasm, the physical basis of life in plants and animals. Phenomena of birth, growth, decay and death appear for the first time. The Second Logos has a triple function and builds up what are known as "permanent atoms", germ-cells and body-cells.² Vitality is the expression of the force of the Second Logos on the physical plane. (Diagram 7.)

And finally, when the animal is sufficiently evolved to become individualized, then the First Logos begins to function. He puts forth a "Fragment of Himself, a monad", and then man made "in the image of God" makes his appearance.

The Appearance
of Man

In him for the first time we see the Solar Logos, Lord of our system, with all His Three Aspects working. The First Logos again has a triple function and endows man with the qualities of Will, Wisdom and Activity. The expression of the force of the First Logos on the physical plane is Kundalini, the "Serpent Fire", which "leads to immortality". (Diagram 7.)

¹ See monograph on "From Mineral to Man," Part II.—ED.

² R. F. Goudey, "The Occultism of the Atom", T., April 1937.

Functions of the
different Aspects
of the Logos

The function of the Third Logos is the creation of atoms on all planes; that of the Second Logos is to shape the atoms into forms; that of the First Logos is to ensoul the forms. Metaphorically speaking, the formation of bricks, the foundation-stones of the universe, may be represented as the work of the Third Logos; building a house with the bricks, as the work of the Second Logos; inhabiting the house by a living being as the work of the First Logos. (Diagram 7.)

This does not mean that at any time one aspect of the Logos is working and the other two are inactive. All the time the Solar Logos, as a whole, is active, but according to the nature of the function one of His aspects is more emphasized than the other.

When the Solar Logos energizes His Universe, He always manifests as a Trinity. The rationale of this will be explained later. As in Life, so in Form; as in Spirit, so in Matter, there is this triplicity of manifestation. There are correspondences in universal Matter with the aspects of the universal Self, and so we find Matter manifesting the three qualities of Inertia, Rhythm and Mobility, and Spirit its three fundamental expressions of Will, Wisdom and Activity. It should be noted that neither spirit nor matter can exist alone. Both appear and disappear simultaneously. They are inseparable parts of a unity, manifesting as a duality in space and time. Symbolically, they are represented as two interlaced triangles, thus, ☆

We cannot conclude this section better than by sharing with the reader the beautiful ideas given in the following passage :

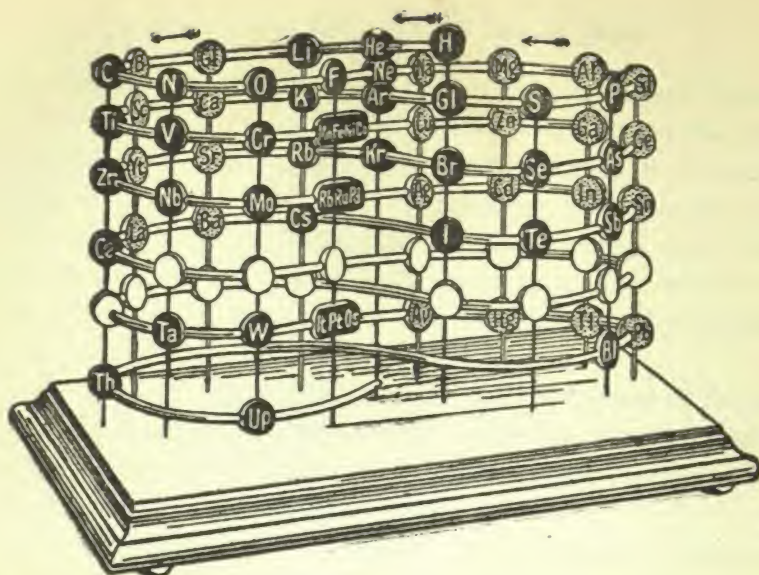
To see that Plan is to have the Beatific Vision ; to work for that Plan is to change one's mortal nature to that of a deathless immortal. Deathlessness in life, Eternity in time, Divinity in humanity, are his who, understanding the Plan, works for it unceasingly.¹

The Scientist and the Materialist Philosopher are groping after the Plan, the Poet and the Artist intuit it, the Occultist sees it, the Adept *knows* it.

Scientific View of
the Genesis of
Elements

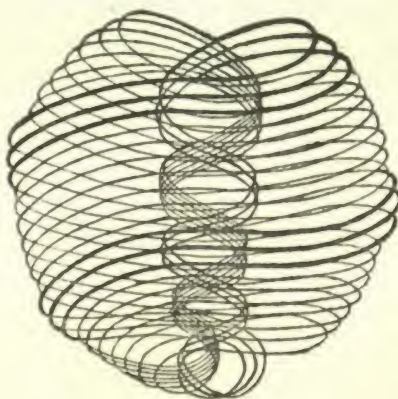
Having given the theosophical conception of the origin and evolution of matter, let us now see what the modern science of Chemistry has to say on the same subject.

¹ F.P.T., (1938), p. 207.



Sir William Crookes' diagram of the Periodic Law of the Elements. (Proceedings of the Royal Society, 1-6-1898.)

The new group of X-, Y-, Z- Interperiodics discovered by the clairvoyant investigators fills beautifully the gap between Ru, Rh, Pd and Os, Tr, Pt. (see A note on Occult Chemistry this Part.)



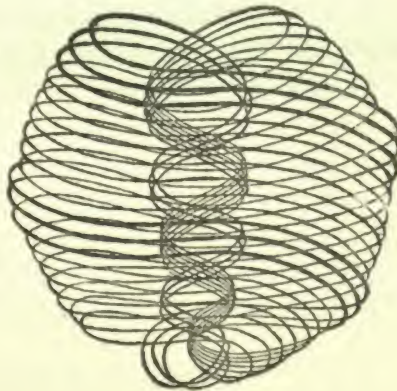
Positive Physical Atom

DIAGRAM 8



These figures show the great similarity in the theosophical and scientific viewpoints of the creation of matter. The caduceus-like form brings out very clearly the close resemblance in form to the Rod of the Caduceus¹ as seen in the structure of the ultimate physical atom and Crookes' representation of the Periodic Law of the Elements.

(All the figures on this page are reproduced by courtesy of Mr. C. Jinarājadāsa and the Theosophical Publishing House, Adyar.)



Negative Physical Atom

DIAGRAM 8

¹ S.D., I, 600.



THE
OFFICE OF THE
SHERIFF
OF THE COUNTY OF
LOS ANGELES
CALIFORNIA
HAS BEEN
RECEIVED
THE
FOLLOWING
NOTICE
FROM
THE
SHERIFF
OF THE COUNTY OF
LOS ANGELES
CALIFORNIA
ON THE
10TH DAY OF
JANUARY
1900
AT
LOS ANGELES
CALIFORNIA



If there was ever a scientist who approached very close to the occult view of the evolution of matter and the formation of the physical atom and chemical elements, it was Sir William Crookes. His address on the "Genesis of the Elements" was epoch-making. A comparison of the two diagrams, one of "the Rod of the Caduceus" illustrating the theosophical view of the creation of matter¹ and the other of Crookes—(figure of 8)—diagram of the Periodic Law showing the scientific view of the genesis of the elements,² is very illuminating and shows how very close Crookes came to the occult view (diagram 8). His reflections on his own diagram are worth noting here :

The more I ponder over the arrangement of this zigzag curve, the more I become convinced that he who fully grasps its meaning holds the key to unlock some of the deepest mysteries of creation.

Crookes gives a picture of the "Genesis of the Elements" out of a primordial substance which he calls "protyle", (compare the "Koilon" of the occultists) and shows how three different forces (compare the triple function of the Logos) acting upon this substance bring forth the chemical elements one after another, how elements showing similar physical, chemical, electrical and magnetic properties fall in their natural positions in the diagram,³ one below the other. He wants us to picture first the action of two forces on the original protyle—one being time, accompanied by a lowering of temperature; the other (motion) swinging to and fro like a mighty pendulum, having periodic cycles of ebb and flow, rest and activity, being intimately connected with electricity. He introduces space as the third factor, for nature, he says, does not act on a flat plane, but demands space for her cosmogonic operations, and he considers a lemniscate or a figure of eight (8) best to meet all the conditions involved. This figure would be the result of three simultaneous motions, one east-west, another at right angles to it, *i.e.*, north-south, and the third again at right angles to these two (suppose downwards). Where these forces meet and cross there protyle is affected and an element is generated.⁴

When Fohat is said to produce Seven Laya Centres,⁵ it means that, for formative or creative purposes, the *Great Law*—Theists may call it God—

¹ S.D., I, 600.

² *Proceedings of the Royal Society*, 9-6-1898.

³ See diagram 1 given in "A Note on Occult Chemistry", this Part.—ED.

⁴ S.D., I, 600-601.

⁵ "Laya or Laya-centre may be defined as the neutral or zero point above and below which, or through which, some differentiation or change of manifestation takes place, hence the LAYA-CENTRE is that abstract point from which concrete manifestation proceeds".

stays, or rather modifies, its perpetual motion on seven invisible points within the area of the Manifested Universe. '*The Great Breath digs through space seven holes into Laya, to cause them to circumgyrate during Manvantara*', says the *Occult Catechism*.¹

The seven Laya Centres are the seven zero-points, using the term zero in the same sense that Chemists do. It indicates, in Esotericism, a point at which the reckoning of differentiation begins.²

The above two quotations will perhaps give an insight into the *modus operandi* of the forces referred to by Crookes in the formation of the different chemical elements.

What figure closely resembling the figure of eight (8) could more graphically depict the picture of the genesis of the elements than the Rod of the Caduceus symbolizing the evolution of the Gods and atoms? *The Secret Doctrine* gives some more hints on the same subject for research. It says :

A lemniscate for the evolution downward, from Spirit into Matter; another form of a spiral, perhaps, in its reinvolutionary path onward, from matter into Spirit; and the necessary, gradual and final reabsorption into the *laya* state, that which Science calls, in her own way, "the point neutral as to electricity", or the zero point. Such are the Occult facts and statement. They may be left with the greatest security and confidence to Science, to be justified some day.³

* * * *

In order to thoroughly understand and appreciate the significance and importance of the valuable contributions of Crookes and other equally brilliant scientists to the scientific and philosophic thought of the day, it is necessary to know what ideas prevailed as regards life, thought, matter, etc. during the last quarter of the last century. The key-note of the thought was "materialism". That note was struck by Professor Tyndall when he, as President of the British Association at Belfast in 1874, after taking a masterly survey of the investigations done in the physical and natural sciences, made the following memorable statement :

By an intellectual necessity I cross the boundary of the experimental evidence, and *discern in that matter* which we, in our ignorance of its latent powers, and notwithstanding our professed reverence for its Creator, have hitherto covered with opprobrium, *the promise and potency of all terrestrial life*. [The italics are mine.—D.D.K.]

¹ S.D., I, 171.

² S.D., I, 162.

³ S.D., I, 601.

Again "Man" was supposed to be a chemical machine and "life" was thought of as the consequence of organization. Some considered "life" to be a product of matter acted upon by chemical, electrical and other physical forces, while others considered it to be a series of fermentations. Similarly, intellect was supposed to be "simply the activity of nerve-cells", and "thought" was supposed by Carl Vogt to be a secretion of the brain just in the same way as bile was a secretion of the liver. "Evolution", according to Haeckel, "was the result of a fortuitous concourse of atoms". The scientists and philosophers of the day thought it to be possible to manufacture life from dead matter, which they supposed to be "inanimate material and self-guiding Atoms".¹

While Science speaks of its evolution through brute matter, blind force, and senseless motion, the Occultists point to *Intelligent Law* and *Sentient Life* and add that Fohat² is the guiding Spirit of all this.³

These facts show that materialism had reached its zenith during the close of the nineteenth century and science had come to a blank wall, an impassable barrier as it were. This stronghold of materialism was successfully attacked by a number of brilliant scientists, and the apparently impenetrable barrier was broken in the last decade of the nineteenth century. This period of demolition coincided with the golden period of epoch-making discoveries; —a period which was marked by the discovery of X-rays by Röntgen in 1895, of a new property of matter called Radioactivity by Henri Becquerel in 1896, and of Radium by M. and Mme. Curie in 1898. It is these and the researches of Crookes on highly attenuated gases in vacuum tubes by passing electric discharges through them, which paved the way for the great discovery of the ultra-atomic corpuscles, the constituents of the atoms which may be said to have given a death-blow to materialistic science.⁴ These researches giving birth to a new concept of the atom have brought about a complete change in scientific thought, initiated the modern transformation of scientific opinion from gross materialism to a spiritual outlook, and opened out a vast field and, without exaggeration, a new world for research.

Opening of a
New Cycle

¹ S.D., I, 622.

² Energy of the Logos.

³ S.D., I, 163.

⁴ See "The Story of Atomic Energy", this Part.—Ed.

⁵ See pp. 159-61, Part I, this book.—Ed.

How clearly this was foreseen by Madame Blavatsky may be seen from the following statement of hers in *The Secret Doctrine* :¹

... We are at the very close of the cycle of 5,000 years of the present Āryan Kali Yuga; and between this time² and 1897 there will be a large rent made in the Veil of Nature, and materialistic Science will receive a death-blow".

"A large rent made in the Veil of Nature"—what a graphic description! No more appropriate words could have been chosen than these to show that the "Ring-Pass-Not" has been broken, that a new world has been opened out before mankind, a world of hope and cheer and light where before was absolute darkness and blankness.

The world owes a deep debt of gratitude to the great scientists who have opened out this new world to us. Let us see what these epoch-making discoveries were which made this possible. They may be summarized thus:

(1) The discovery by Crookes of a new state of matter which he called "the Fourth State of Matter" or "Radiant Matter".

While writing on the "Fourth State of Matter" to Sinnett, the Master K. H. wrote:³

Let him [Crookes] know . . . that Western Science has still three additional states of matter to discover . . .⁴

The men of science have just found out "a fourth state of matter", whereas the occultists have penetrated ages ago beyond the sixth and, therefore, do not infer but KNOW of the existence of the seventh—the last.

This statement is worth pondering over. (Vide Supra.)

(2) The discovery of ultra-gaseous particles 1,850 times smaller than the smallest atom known, namely the hydrogen atom, by J. J. Thomson.

(3) The discovery of a new property of matter (radioactivity) by Henri Becquerel, and of radium and other naturally occurring radioactive elements by Monsieur and Madame Curie. These discoveries were of fundamental importance because they broke through the impenetrable barriers which guard the future. To this may be added the discovery of artificial radioactivity (1934) by Irene Curie Joliot (Madame Curie's daughter) and M. Joliot. These researches and a host of others⁵ done by

¹ S.D., I, 671; see also p. 159, Part I, this book.—Ed.

² 1888, the date of this writing.

³ *The Mahatma Letters to A. P. Sinnett*, p. 341.

⁴ See diagrams 1, 2 and 3.—D.D.K.

⁵ See "The Story of Atomic Energy", this Part.

eminent scientists of different countries, to bring under control atomic energy have brought about a great revolution in our conception of matter and its transformations.

(4) The discovery of particles of matter travelling with a speed, almost approaching that of light, the average speed being 100,000 miles per second.

(5) The discovery of particles of matter showing a tremendous penetrating power.

This discovery was made in 1895, but it was predicted by Madame Blavatsky in *The Secret Doctrine*, Vol. 1, p. 272, so early as 1888 when she wrote :

The characteristics of matter must clearly bear a direct relation always to the senses of man . . . and the next characteristic it develops—let us call it for the moment "Permeability"—will correspond to the next sense of man, which we may call "Normal Clairvoyance".

These ultra-atomic corpuscles are the primordial constituents of the atoms of our chemical elements and of all forms of matter.

(6) That matter and energy are now interconvertible terms. Energy condenses to matter; matter is resolved into energy.

(7) The discovery of the transmutation of one element into another, and of making oxygen from nitrogen by Rutherford in 1919 by breaking for the first time through the impenetrable barrier around the atomic kernel.

(8) The discovery of a new source of energy, called the *intra-atomic* energy, liberated normally from the atoms of radioactive substances when they are disintegrating, or for that matter, from the atoms of any matter when they are made to disintegrate.

The discovery of a new property of matter, for example, radioactivity of the penetrating power of matter, X-rays, and a new source of energy, for example, the atomic energy, herald the birth of a new age, a new phase of consciousness, a new civilization.

The energy release which accompanies uranium fission is far greater than ever has been known before. An energy of 100,000,000 volts produced artificially on earth by the capture of a neutron is a figure just as startling to physicists as to laymen. No comparable process is known; no particles of such great mass have ever been liberated before. (See "The Story of Atomic Energy", this Part.)

The energies involved are far beyond the range of energies known before on earth. Natural radioactive elements produce 14,000,000 electron volt alpha particles, the cyclotron¹ has produced 32,000,000 volt alpha particles, but fission produces 100,000,000 volt barium particles.² This energy is of a different order altogether. It is different from the usual *inter-atomic* energy which get we from wood, coal and petrol. 1 pound of uranium contains within itself as much energy as could be obtained by the burning of ten million tons of coal.

The invention of the atom bomb and its use in World War II show that the terrific forces locked up in the atom have now come under man's control. The use of the atom bomb is not a civilized way of settling disputes between nations. If such use is persisted in future wars then the present civilization is doomed. The atom bomb is a challenge to man.³

In the invention of the atom bomb science has reached a very high level of efficiency, skill, ingenuity and co-operative effort. If the same zeal and co-operative efforts are shown in the utilization of the atomic energy for peaceful purposes, if there is no frustration of science, if the problem is attacked from several fronts, it will lead to a new civilization based on spiritual foundations, " 'through valid philosophy rooted in nature, law and order', where there will be real freedom from want and freedom from fear ".⁴

In the spontaneous disintegration of the atoms of elements or the conscious and deliberate smashing of the atoms as we have seen in the production and use of atom bombs in World War II, we see the verification of the dream of the alchemists of old who believed (a) in the possibility of the transmutation of elements, (b) in the family relationship between elements, (c) in the evolution of elements, and (d) in the birth, growth, decay and death of elements.

It should be noted that the two processes, namely, the disintegration of an atom and the liberation of tremendous energy in this disintegration, take place *simultaneously*, and of course the latter process is of far greater importance and value than the former.

¹ A cyclotron, an atom-smashing machine, is a device which imparts tremendous speeds to sub-atomic projectiles by whirling them around in a magnetic field.

² A. K. Solomon, *Why Smash Atoms*.

³ A note on this subject is given further on.

⁴ *Main Currents in Modern Thought*.

Dream of the
Alchemists

Now the dream of the alchemists was a search for the "Philosopher's Stone" and the "Elixir of Life". The former was supposed to have the potentiality of transmuting base metals, like mercury and copper, into silver and gold; the latter was supposed to confer eternal youth and immortality; and again, these two were not different substances, but the same substance was supposed to have both these properties. The "Philosopher's Stone" was the "Elixir of Life". One represents the material side, the other the energy side.

It does not require much effort of the imagination to see in energy the life of the physical universe, and the key to the primary fountain of the physical life of the universe today is known to be transmutation. Is then this old association of the power of transmutation with the "elixir of life" a mere coincidence? I prefer to believe it may be an echo from one of the many previous epochs in the unrecorded history of the world, of an age of men who have trod before the road we are treading today, in a past possibly so remote that even the very atoms of its civilization literally have had time to disintegrate.¹

Are we merely re-discovering today, as Professor Soddy supposes, what the ancients knew ages before? Theosophy answers this question in the affirmative, and says that a mighty civilization existed in the remote past;² it reached its zenith and then had its fall according to the Law of Cycles (explained later). The legend of the Fall of Man is not a myth. Our present-day civilization which is of a *mental* type, as distinguished from its predecessor which was of an *emotional* type, has been built on the ashes of the old, has not yet surpassed it, will reach its zenith in the distant future which will be higher than that reached by its predecessor, and in its turn will make room for the next civilization whose chief characteristic will be the development of the *intuitive* faculty. Soddy writes further:

Science has reconstructed the story of the past as one of a *continuous* ascent of Man to the present-day level of his powers. (Author's italics.)

Theosophy holds a different view³ and has its own reasons to do so as will be shown further on in the explanation of the Septenary Law.

¹ Soddy, *The Interpretation of Radium*, p. 250.

² See the Monographs on "Geology and Archæology", Part I of this Series and "The Old Order Changeth, yielding place to New". Part IV.

³ *Vide infra*, p. 302.

The reader will find a large number of illustrations of this law in the different monographs in this Series.

The energy which emanates from radium and other radioactive bodies has been doing so incessantly, day in and day out, year in and year out, for centuries past, but so far we have not been able to control it for use in peaceful times. Soddy compares this state of helplessness in which we find ourselves today to that of the primitive man when he saw the whole forest on fire but did not know how to make the fire himself and when made, to control it. The primitive man may be said to have then stood on the threshold of our present-day civilization, which has risen to such heights only after he was able to control the energy locked up in the wood and the coal. Similarly, today we are standing on the threshold of a new civilization, at the beginning of a new era. What a revolution it will bring about in our life when man will have got *complete* control over this intra-atomic energy one can only faintly perceive! But whether it will be a blessing or a curse will depend on what use or misuse he will make of it. If rightly used the atomic energy may verily prove to be the "elixir of life". (vide infra.)

The formation of a Society in London in 1937¹ by orthodox scientists for the Study of Alchemy and Early Chemistry, augurs well for the future, provided the mystical aspect of alchemy is given its rightful place in their deliberations.

This question has come very much in the forefront and been seriously discussed at the representative scientific gatherings for the last many years. It began with the addresses which the Presidents of the British Association for the Advancement of Science gave in the Annual Meetings who devoted each an important part of his address to the discussion of this subject and has now culminated in the formation of "Atomic Scientists' Association, in London in 1946 with the main purpose of providing a forum for discussion" of the subject. The late Sir Alfred Ewing while expressing his grave doubts as to the fitness of man to use the gifts bestowed on him by scientists and inventors said in 1932:

Man is ethically unprepared for the great bounty. In the slow evolution of morals he is still unfit for the tremendous responsibility it entails. The

¹ *Nature*, 31-7-1937, p. 188.

command of Nature has been put into his hands before he knows how to command himself.

In an important editorial written in *Nature*¹ on "Social Responsibilities of Science", the editor points out that

Social Responsi-
bilities of Science

Science has a spiritual message as well as its material aspect, and that it demands a supreme loyalty to truth which must override all other claims if error and delusion are not to result. The search for truth is not fulfilled by giving bare facts, numbers or abstract theories only; *there must be also some sense of values and of perspective*, (author's italics), and concludes by speaking of

a vision of the possibilities and benefits which the scientific spirit linked with a sense of human values might bring to mankind. Once that is kindled, the human spirit will not long delay to break the shackles with which craven and retrograde political creeds and nationalist systems have sought to restrain its advance into an age of freedom and plenty, where man's mind and spirit, released from the cramping influence of poverty, disease and war, may achieve a stature and creative fertility hitherto unknown.

Quite true; we whole-heartedly agree, that the scientific spirit must be linked with a sense of human values and of perspective, but this in our view is possible only when the constitution of man *as a whole* is known and his relation with the universe; and this subject is found nowhere so clearly and comprehensively treated as in theosophical literature.²

How clearly and comprehensively Madame Blavatsky had anticipated the above ideas may be seen from what she wrote concerning the misuse of forces which may "run the risk of becoming curses more often than blessings in the hands of the selfish—of the Cains of the human race".³

Theosophy and
Misuse of Occult
Force

She adds further on :

The discovery [of this OCCULT Force in] its completeness is by several thousand—or shall we say hundred thousand—years too premature. It will be in its appointed place and time only when the great roaring flood of starvation, misery, and underpaid labour ebbs back again . . . and the pitiful cry for bread, that rings unheeded throughout the world, has died away.⁴ [Author's Italics]

¹ 24-4-1937.

² See Part I of this Series, Introductions to different parts and a number of other monographs in the book.

³ S.D., I, 609.

⁴ S.D., I, 615.

We are now in a position to understand the significance of the following statement: "... and one by one facts and processes in Nature's workshops are *permitted* to find their way into exact Science, while mysterious help is given to *rare individuals* in unravelling its arcana".

Importance of
Purification and
Dedication

(Author's Italics). It is only when proper persons are found who would dedicate their lives to the service of humanity, that the knowledge of the unseen forces both within man and in nature will be released by the Great Lords of Compassion and Wisdom, who are themselves Servants of Humanity. At the same time the wisdom of the ancients in withholding knowledge of the mysteries from those who would misuse them will be evident to those who are watching the crisis through which the world is passing today.

The Significance of
Withholding the
Knowledge¹

We may conclude this section of our article by quoting the memorable statement made by Sir William Crookes as President at the annual meeting of the British Association held at Bristol in 1898, which was in vivid contrast to the equally memorable statement made by Professor Tyndall from the same chair in 1874, namely, "I discern in *that matter* ... the promise and potency of *all terrestrial life*".

Bridge between
Materialism and
Idealism

I should prefer to reverse the apophthegm and to say that in *life* I see the promise and potency of all forms of *matter*. [Author's Italics]

Much water has flowed under the bridges of the world since 1898, and the views held by the leading scientific philosophers of the day are tending distinctly towards the latter pronouncement.² But the World Thought has been swinging alternately between materialism and idealism. Is there any meeting-ground between these two positions?

The physical is the reflection of the spiritual. "As above, so below."³ To understand the question of materialism and idealism, or their counterparts determinism and free will, (particle-theory and wave-theory of the physicist), which is agitating the mind of the present-day scientist and philosopher, let us take a simile from Nature which will perhaps help us to understand

Determinism and
Free Will

¹ See Notes on "The Atomic Bomb—A Challenge to Man", and "The story of Atomic Energy", this Part.—Ed.

² See Part I of this Series, Introduction.

³ *The Universe Around Us.* by Sir James Jeans, 4th Edition, 1944. The Chapters on "Exploring the Sky" and "Exploring the Atom" are verifications of this statement.

the question better. The two arms, right and left, would serve as a good symbol to illustrate duality. The two symbolically represent the great theories of Idealism and Materialism which are as old as creation. They have been the despair of modern thought and the world thought is oscillating between these two extremes, sometimes one idea dominating and sometimes the other. Now suppose one arm is cut off; could it exist alone and do any work? The answer is perfectly clear. In order that the two arms may help the whole organism and carry it forward in its evolutionary progress, the following two conditions are necessary: (1) that the two arms should be parts of the one organism and linked to it, and (2) that they should be guided in their work by an intelligence. Exactly in the same way neither Idealism nor Materialism can stand alone;¹ it is impossible from the very nature of things, as we have seen in the theosophical theory of creation; spirit and matter come into manifestation together like the positive and negative charges of electricity, and go out of manifestation together as the positive and negative charges merge into neutral electricity. So idealism and materialism will exist as workable theories as long as creation lasts, for both are true, and it should not be forgotten as we learn from the simile of the two arms that both of them derive their strength and inspiration from the source from which they come, namely, "Boundless Space of the Divine Plenum"—The Living Intelligence—That which is indescribable—and not as the result of "a fortuitous concourse of atoms". Thus, what Sir William Bragg has said is true, namely, that one theory holds good on Mondays, Wednesdays and Fridays, and the other theory on Tuesdays, Thursdays and Saturdays; but if this statement is amplified and stated thus, namely, that both theories hold good for all the days of the week, it would be a statement more in accordance with what we see in nature and perhaps help to bridge over the gulf between the two.

Theosophy says that the Universe is a Unity. We live in the "Boundless Space of the Divine Plenum". It is literally true that we live and move and have our being in Him.²

The Unity of the
Universe

The Universe is "one complete balanced system, in which no slightest alteration can be made anywhere without a readjustment *everywhere*. No single minutest particle of matter can be moved,

¹ See the General Introduction to the Second Edition, Vol. I.—ED.

² See Diagrams 1 to 7 and 10 particularly diagram 5.

can be accelerated or retarded, but it necessitates a corresponding adjustment *on all the Planes of the Cosmos.*"¹ This gives us an insight into a very important law of nature: All rise together or fall together. No one individual, community, nation or race can hope to rise by crushing another

Brotherhood is a
Fact in Nature

individual, community, nation or race. If we do not wish our modern civilization to be destroyed, we should make an earnest effort to present *this* idea of Brotherhood—which is a fact in nature—on rational grounds to the people of the world and above all *live* up to that ideal.²

"Whenever any question of evolution or development in any Kingdom presents itself to you, bear constantly in mind that everything comes under the Septenary 'rule of series in their correspondencies and mutual relation throughout nature'".³

The Septenary
System : Its
Rationale

There is no branch of science which lends itself so beautifully to the illustration of some of the occult truths as Chemistry. In the occult view given above of the creation of matter, we observed that the whole of the manifested universe has come from One; the One became Three, and the Three became Seven. We spoke of the Unity, the Trinity and the Septenary System. We spoke of three qualities of matter, seven types of matter and seven sub-states of matter. We also spoke of three and seven forces acting on the atom. Are they figments of one's imagination, or does a deep truth underlie their manifestation? Let us see.

We shall endeavour to prove that the importance attached to the number *seven* throughout all antiquity was due to no fanciful imaginings of uneducated priests, but to a profound knowledge of Natural Law.⁴

In the analysis of all that exists we arrive at the following great generalization: The "Self", the "not-Self", and *the relation between the two*. The Self is consciousness, the not-Self is matter, and in manifestation they are always together, they are linked one with the other, closely or remotely. Thus we have a Trinity. The interplay of consciousness and matter shows itself as the ever-changing universe.

Now let us try to understand how seven arises from three. We may illustrate it by the following examples, taken from three qualities, each of matter and consciousness.

¹ Kingsland, *The Physics of The Secret Doctrine*, p. 141.

² See Introduction to Part I.—ED.

³ *The Mahatma Letters to A. P. Sinnett*.

⁴ S.D., I. 497.

Root-matter has three fundamental qualities, inertia, mobility and rhythm, and according as one or other of these three qualities, either singly or in combination, is more strongly energized by the life of the Logos than the others, the triad produces the septenate as shown below. (The quality underlined is more energized than the one which is not.)

- (1) Inertia, Mobility, Rhythm.
- (2) Inertia, Mobility, Rhythm.
- (3) Inertia, Mobility, Rhythm.
- (4) Inertia, Mobility, Rhythm.
- (5) Inertia, Mobility, Rhythm.
- (6) Inertia, Mobility, Rhythm.
- (7) Inertia, Mobility, Rhythm.

This explains how we get seven different types of matter, the seventh being one in which the three qualities are equally active.

Similarly, the life of the Logos manifests itself in seven different streams or rays. Out of the three aspects of consciousness, Will, Wisdom and Activity, by permutations and combinations we get seven rays, seven types of consciousness, seven types of temperament, thus:

- (1) Will, Wisdom, Activity.
- (2) Will, Wisdom, Activity.
- (3) Will, Wisdom, Activity.
- (4) Will, Wisdom, Activity.
- (5) Will, Wisdom, Activity.
- (6) Will, Wisdom, Activity.
- (7) Will, Wisdom, Activity.

Seven Rays

Seven Types of Consciousness

Seven Types of Temperament

As the whole manifested universe is an interplay of consciousness and matter, we find our solar system based on the septenary basis. Therefore, the number seven is spoken of as the "root-number of our system". This is a fundamental law and shows itself in all the kingdoms of nature; in atom, in man, in the universe.

Illustrations of
the Septenary
Law

We see the law of seven or multiple of seven illustrated in the mineral kingdom where we find minerals and their salts grouping themselves into seven Crystal Systems, namely, (1) Triclinic, (2) Monoclinic, (3) Rhombic, (4) Tetragonal, (5) Trigonal, (6) Hexagonal and (7) Cubic. We see the same law manifesting itself in the Periodic Law of the Elements (Mendeléeff's and its new developments),¹ in the Periodicity of Atomic Volumes (Lothar Meyer)² and in many other properties of the elements. Just as seasons recur periodically year after year, so do the physical and chemical properties of the elements recur or accentuate periodically with increasing atomic weights. Just as notes in music repeat themselves on higher or lower octaves, so do the properties of the elements more or less resembling one another recur periodically with the increase of atomic numbers. Just as the waters of the sea rise and fall, flow and ebb regularly, so do the atomic volumes (relationship between atomic volumes and atomic weights of the elements first brought to light by Lothar Meyer) rise and fall as shown in diagram 9. There are heights and depths, hills and valleys, not a regularly rising or falling line.

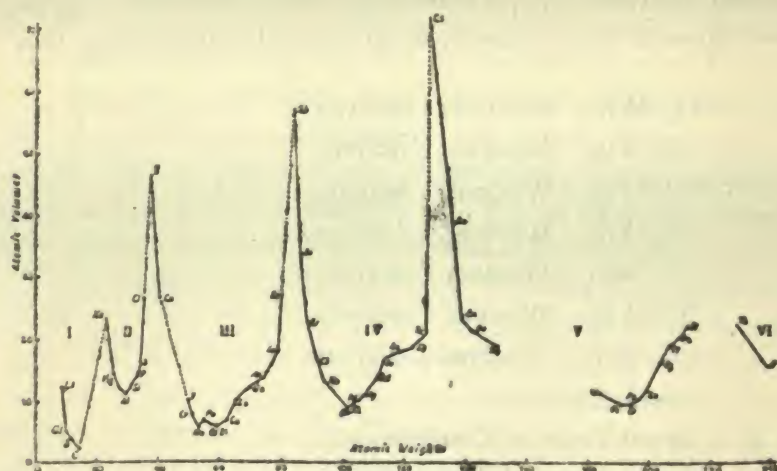


DIAGRAM 9

This diagram shows the relationship between atomic volumes and atomic weights of elements. It brings out the periodicity of atomic volumes, their rise and fall.

¹ See Table 2, in "A Note on Occult Chemistry," this Part.—ED.

² Diagram 9.

The periodic evolution of hydrogen from a dissolving metal, the periodic catalytic decomposition of hydrogen peroxide, the periodic crystallization of potassium dichromate and of benzoic acid, the periodic precipitations or rhythmic formations called "Liesegang rings", the rhythmic bands of Purple of Cassius, the striking wave-formations observed in clouds on a summer evening, the rhythmic markings on some butterflies' wings, the rings in agates and in tree-trunks, the heart beats, the expanding and contracting universe, are a few more examples taken from other sciences like biology, geology, meteorology, etc., illustrating the Law of Periodicity.¹ They show that there is Rhythm in Nature. The cause of the periodicity may be either inherent or due to external causes. Remotely, it may be due to the rhythmic in-breathing and out-breathing of the Logos. A disturbance in this rhythm may be the cause of many disorders, physiological and psychological, and perhaps economical and political too.

We have seen above that growth and progress in nature are not in a continuous straight line, but are marked by rises and falls. The reader will find this law illustrated in the rise and fall of cultures and civilizations,² races and institutions, rounds and chains, etc., in other monographs also. These laws are occult keys which, if judiciously and intelligently used, would serve as guides for research and, who knows, may prove useful in unravelling some of the mysteries of nature. (*Vide* diagram 7).

We are now in a position to answer the question with which we started. Diagram 1 shows the field of evolution of average humanity. It also points out the next step in evolution which humanity will take in the near future; that step will be the awakening of the *intuitional* principle in man. Diagrams 1, 2, 3, and 10 again indicate what a small part of ourselves is the visible part, namely, the physical body, while the major portion of our self lives in the invisible worlds. Again what a small part of the universe is the visible universe. Of the 49 sub-planes which constitute the physical universe and man, the visible parts of man and the universe are embodied only in the three lowest sub-planes of the physical plane, while the remaining 46 sub-planes constitute the invisible part. Now modern science recognizes as her legitimate field for study and research the visible universe and the visible man (visible

¹ See for further examples and diagrams, *The Problem of Physico-Chemical Periodicity*, by E. S. Hedges and J. E. Myers.

² See in this connection *The Revolutions of Civilization*, by F. Petrie.

Crookes. It would be interesting to find out how far in the regions above the gaseous the discoveries of electron, proton, neutron and cosmic rays have carried our present-day scientists. The field of research for Science is the region above the gaseous on the physical plane.¹ It would be equally interesting to find out how far the modern psychologists have penetrated into the regions of the emotional, mental and intuitional planes. These planes constitute the field of research for Modern Psychology.²

It is a matter of gratification to note that science recognizes the existence of worlds other than the external world of the physicist. Sir Arthur Eddington says in this connection :

The external world described in physics (E. & O.E.) really exists. One thing can perhaps usefully be added. I do not think that with any legitimate usage of the word it can be said that the external world of physics is the *only* world that really exists.³

It is possible and conceivable that the scientists may enter, or have already entered, these worlds, in other words, the remaining sub-planes of the physical plane, with the help of the method they are following now. But, will they be able to use the same method for the investigation of matter of the higher planes, namely matter of the astral and mental planes? ⁴ It must be remembered that so far as the matter of the different sub-planes of the physical plane is concerned, there is only a difference in *degree*, but not so with the matter of the astral and higher planes where the difference is one of *type*.

And each plane is governed by its specific laws of evolution and absorption.⁵

The relationship between two consecutive planes of matter is shown very clearly by Madame Blavatsky. She explains :

Thus, imagine two consecutive planes of matter ; each of these corresponding to an appropriate set of perceptive organs. We are forced to admit that between these two planes of matter an incessant circulation takes place ; and if we follow the atoms and molecules of, say, the lower in their transformation upwards, they will come to a point where they pass altogether beyond the range of the faculties we are using on the lower plane. In fact, for us the matter of the lower plane there vanishes from our perception—or rather, it passes on

¹ Diagram 10. Some of the lines of research are indicated in the monograph on "Matter and the Atom."—Ed.

² See the monographs on "Psychology and Psychic Research"—Ed.

³ Eddington, *New Pathways in Science*, p. 26.

⁴ Diagram 10.

⁵ S.D., I, 174.

to the higher plane, and the state of matter corresponding to such a point of transition must certainly possess special, and not readily discoverable, properties.¹

Shall we say that modern science will gradually come to the same viewpoint, namely, that a new line of attack, a new method of research and a new type of instrument will be necessary in the investigation of the matter of the plane or planes higher than the physical? The instruments ordinarily used by the scientist are not helpful here, however delicate or powerful they may be. There is no outside instrument required in this method. The instrument which is required to be perfected is the man himself, the *whole* man, the real man with all his vehicles—his physical body which is the body of action, his astral body which is the body of desire, and his mental body which is the body of thought; and *the very first essential is purification and dedication of all of one's powers to the service of humanity.*²

As the mountain is reflected in the still waters of a lake, so is the Sun of Truth reflected in the mind of a man who is pure, controlled and harmonized and has attained peace. If such a man could raise his consciousness to the highest level of the mental plane which is in vibratory response with the cosmic mental plane—the archetypal world—it is possible that he might get a dim vision of the Plan of Evolution as it is in the thought of the Logos Himself.³

The vision such a man would see might be the vision of a Universe governed by Law, the vision of Evolution based on the Septenary Law, the vision of a Universe based on a magnificent Plan and directed by a mighty Intelligence. *Such a vision would give a correct value and a proper perspective to life.* Our knowledge then would not be a mere matter of belief, but one based on direct vision.

Though for most of us this vision is not as yet attainable, yet is there another vision of the purified intellect and of the glorified intuition which is indeed as a beacon light to guide our steps amid the dark paths of our mortal world. If Theosophy cannot at once and to all give the direct vision to the eye, it can at least give, more satisfactorily than any other philosophy, a vision of "things as they are" to the human intellect which inspires to good and adds to life's enthusiasms. Till all can see what now only a few see, this is all that Theosophy can legitimately claim, as the vision of the invisible worlds is thus revealed to the aspiring intellects of men.⁴

¹ S.D., I, 171-72.

² See p. 8, Part I of this Series.

³ Diagrams 2, 3, 6, 7 and 10.

⁴ F.P.T., (1938) p. 142.

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¹ This bibliography is for *Chemistry* and the other additional Notes to this article, as well as for "A Note on Occult Chemistry".

THE STORY OF ATOMIC ENERGY

BY D. D. KANGA

THE story of the release and control of atomic energy, of the production of the atom bomb and of the development of atomic research is a romance and furnishes a fine example of scientific team work. It had its origin in the several epoch-making researches made in the laboratories of many countries during the last two decades of the nineteenth century and since the beginning of the twentieth century. It began with a new field of research by Sir William Crookes in vacuum tubes and the discovery of a new property of matter—**RADIOACTIVITY**—by Henri Becquerel, gradually passed through the most important discovery of the Law of Equivalence of Mass and Energy by Einstein, the far-reaching researches by Lord Rutherford into the nature of the nucleus, the important discovery of neutrons by James Chadwick, and finally culminated in the most significant researches by Otto Hahn and others on the fission of uranium, and the release and control of atomic energy.

EINSTEIN'S LAW OF EQUIVALENCE OF MASS AND ENERGY

The discovery of this law was a discovery of tremendous importance, for it is on the basis of this law that the whole edifice of atomic research culminating in the control and release of atomic energy and the making of the atom bomb has been raised. Let us see what this law is. Every student of science is familiar with the two principles, one of the Conservation of Mass and the other of the Conservation of Energy. They have been the cornerstones of the structure of modern science. They imply that matter and energy can neither be created nor destroyed but only altered in form. Until a few years ago they were unaltered and separate. It is now known that they are two different aspects of the same principle, for, according to this law matter and energy are interconvertible.

There appeared to be an *apparent* violation of the Law of the Conservation of Mass inasmuch as the two sides of the equation as regards masses could not be exactly balanced. For example: the mass of the uranium nucleus is larger than the combined masses of the products of decomposition by about one-fifth of the mass of the proton, or one-thousandth of the mass of the uranium nucleus. It was experimentally proved that the missing mass was liberated in the form of energy, thus vindicating this law of equivalence.

The following is a short STORY OF ATOMIC ENERGY and of the evolution of the atom bomb through atomic research:

1. Researches of Sir William Crookes¹ in vacuum tubes in the eighties of the last century.
2. Discovery of X-rays by Röntgen² in 1895.
3. Discovery of a new property of matter-radioactivity—by Henri Becquerel³ in 1896.
4. Discovery of the Electron by Sir J. J. Thomson⁴ in 1897.
5. Discovery of Radium by M.⁵ and Mme.⁶ Curie in 1898.
6. Discovery of other radioactive elements, namely, Uranium, Thorium, Actinium, etc.
7. Discovery of alpha, beta, gamma rays from these elements. Alpha particles are the first examples known of atomic projectiles.
8. Sir J. J. Thomson's experimental proof that the cathode rays were discrete negatively charged particles.
9. Discovery by Einstein⁷ in 1905 of the Law of the Equivalence of Mass and Energy.
10. Discovery of the heavy isotope of Hydrogen (2H), the Deuteron, by Urey⁸ in 1931. It is used as a projectile in atom smashers. (It is sometimes described as a distinct element and the name "deuterium" and the symbol D are given to it. Deuterium oxide is known as "heavy water".)
11. Discovery of the Atomic Numbers by Mosely⁹ in 1913.
12. Discovery of the atomic twins by Frederic Soddy¹⁰ in 1913 which he named Isotopes.

¹ English.² German.³ French.⁴ English.⁵ French.⁶ Pole.⁷ German.⁸ American.⁹ English.¹⁰ English.

13. Bombardment of the atom (nucleus) by high-energy particles obtained from radioactive bodies by Lord Rutherford¹ in 1919. Rutherford's proposal of the nuclear nature of the atom opened the way to a significant increase in our knowledge of the fundamental constitution of matter. Rutherford was the first scientist to disintegrate elements artificially.
14. Transmutation of Elements.
15. Discovery of 'artificial radioactivity' by Irene Curie Jolio² and M. Jolio³ in 1934. (Vide infra p. 316-7)
16. Discovery of two distinct parts of an atom, namely, the nucleus (the heart of the core of the atom) and the outer shell of electrons, the positive charge of the nucleus balancing the negative charge of the electrons.
17. Discovery of the two fundamental elements from the nucleus, namely, (a) the proton and (b) the neutron. All nuclei are built of protons and neutrons.

DISCOVERY OF THE NEUTRON

About 1920 Rutherford suggested that the problem of nuclear structure would be greatly simplified if there existed a particle with the mass of the proton but having no electric charge. He proposed the name of "neutron" for this hypothetical particle. In 1932 Chadwick⁴ demonstrated that what had been assumed to be extremely penetrating radiation in certain atom-smashing experiments actually was these very neutrons. This discovery takes a very high place of importance inasmuch as it was of considerable help in the development of our understanding of atomic structure and behaviour. The easiest way to obtain neutrons is by the bombardment of light elements like beryllium and boron by protons or alpha particles from radium. The neutron has about the same mass as the proton but carries no electric charge. Being neutral, the neutrons are highly penetrating and therefore principally used in bombarding uranium and uranium-like bodies to bring about their fission, a necessary stage in the production of the atom bomb.

¹ English.

² French.

³ French.

⁴ English.

DISCOVERY OF PLUTONIUM

The agents that are found to initiate nuclear reactions are—in approximate order of importance—neutrons, deuterons, protons, alpha particles, gamma rays, and, rarely, heavier particles. (H.D. Smyth)

Now neutrons act in two different ways. Either they cause fission in the nucleus or they are captured by the nucleus. In the formation of plutonium from uranium the latter reaction takes place. When Enrico Fermi¹ (1934) bombarded uranium (atomic number 92), the heaviest element known to chemists, with neutrons he obtained two new trans-uranium elements with atomic numbers 93 and 94, now known respectively as Neptunium and *Plutonium*. *Plutonium, being more susceptible to fission, is used as the main charge in atom bombs. One of the objectives, therefore, in atom bomb production is to obtain plutonium in as large a quantity as possible.*

DISCOVERY OF URANIUM FISSION

A break-up of the uranium atom or an explosion in the uranium atom with liberation of tremendous energy is what is known as *uranium fission*. The announcement of this discovery early in 1939 fell on scientific ears like a bombshell. The break-up of the uranium nucleus was brought about by Otto Hahn² and his co-workers Lise Meitner,³ Fritsch⁴ and others by bombardment with neutrons. The nucleus broke up into two nearly equal fragments, one of them being an isotope of Barium (atomic number 56) and the other elements being those with varying atomic numbers from 50 to 57 (6-1-39).

Later experiments showed that there was a maximum release of energy when the uranium nucleus (atomic number 92), on bombardment with neutrons, "breaks up into two particles of comparable masses, e.g. Barium (atomic number 56) and Krypton (atomic number 36) which fly apart, due to electrical repulsion between the charges on fission particles. It is found that the sum of the masses of particles into which an excited Uranium nuclear breaks up is less by one part in thousand than that of the parent nucleus and hence this process is accompanied by large release of energy" (vide supra). The energy released per fission of a uranium nucleus was approximately 200 million electron volts.⁵

¹ Italian.² German.³ German Jew.⁴ German Jew.⁵ Burning a substance such as coal releases about four electron volts per atom. This is *inter-atomic* energy. What a contrast between the two kinds of energies!

The fission of uranium was done also by Mme. Curie-Joliot and M. Joliot independently by parallel and other means (1-2-1939).

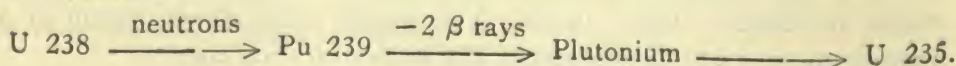
FROM THE REALM OF FANTASY TO THE REGION OF PRACTICAL POLITICS

The discovery of the "fission" of the uranium nucleus by Otto Hahn by bombardment with neutrons, their interpretation by Meitner and Fritsch, and the proof given shortly after, by Joliot, Halban¹ and Kowarski² in Paris and by Fermi and Szilard³ and their collaborators in America that *in this fission several secondary neutrons are given off in addition to the fission fragments*, brought the question of utilizing this discovery from the realm of fantasy to actual possibility. This was the crucial fact, for here was a source of neutrons (secondary neutrons) for which one did not have to waste millions of charged particles (such as alpha particles from radium and other radioactive elements,) in an effort to hit some nuclei, the nucleus having an area ten million times smaller than that of the rest of the atom. (R. E. Peierls: *Science News* 2, p. 9).

DISCOVERY OF THE TWO ISOTOPES OF URANIUM

Niels Bohr⁴ discovered that of the two isotopes of uranium, (U 238 and U 235), it was the rarer isotope uranium 235 which was the most sensitive to fission and breaks up under absorption of both slow and fast neutrons. Uranium 238 is found in abundance. The proportion between the rare (U 235) and the abundant (U 238) isotopes is 1: 140. *The objective therefore is to obtain the very sensitive isotope uranium 235 in as large a quantity as possible.*

Uranium 235 is separated from uranium 238 both by physical devices and chemical means. The lighter isotope U 235 is again more easily obtained from Plutonium 239 by chemical means than from U 238 by the complicated mass-spectrographic separation, a physical device, thus:



¹ French.

² Slav.

³ French.

⁴ Dane.

THE PLUTONIUM SEPARATION PLANT

The plant for the separation of plutonium was designed on the basis of experiments that used only microgram quantities of plutonium. *A microgram is one-millionth of a gram.* Experiments with these microscopic quantities were possible only because of the high stage of perfection to which the science of microchemistry has now reached. This is a romance in itself.

WHAT IS A PILE ?

It was decided to work simultaneously on several methods of isolating uranium 235 and also on production of plutonium. Fermi and Szilard proposed a method to embed lumps of uranium in a matrix of some moderator not unlike raisins in a cake. This construction came to be known as a "lattice" and the resulting structure as a "pile".

For purposes of atom bomb production, plutonium was obtained from the carbon pile first in the pilot plant and then, on a large scale, in the huge industrial plants. It was a remarkable achievement.

Uranium bombarded with neutrons gives a mixture of Uranium and plutonium. (vide supra). This mixture is dissolved in acid and separated chemically into metals or salts of plutonium and uranium.

Plutonium is more susceptible to fission by slow neutrons and could be used in a *chain reaction* like uranium 235, the rare isotope of uranium.

WHAT IS A CHAIN REACTION ?

"It is a very expensive process to continually supply the pile with neutrons generated *outside* the pile. But fortunately during the process of fission, each nucleus emits 2.3 neutrons and these neutrons if they can be made to be absorbed by other fissionable nuclei, will make reaction self-sustaining. This is what is known as chain reaction.

"Some amount of neutron leaks away across the boundary surface of the pile and some other amount is absorbed by impurities like boron and some of the rare earth elements present in uranium, which do not contribute to the maintenance of the fission reaction.

"The following two conditions are therefore necessary for the setting up of a self-reacting atomic pile :

- (1) To isolate and purify a sufficient quantity of fissionable material like uranium 235 or plutonium 239.

- (2) To determine the critical volume of the metal beyond which the fission process once started will be self-maintained".¹

THE ASSEMBLY OF THE ATOM BOMB

The possibility of the manufacture, on a large scale, of uranium 235 and plutonium 239 being demonstrated, the question of the production of the atom bomb was taken up in right earnest. The last stage in this interesting story is the development of atomic energy for peaceful purposes and the development of atomic energy for bombs, for in much of their course they are interchangeable and interdependent.

"The details of mechanism of assembly and control of detonation are not, however, disclosed. According to one version, there is a critical size for detonation, so that ordinarily the pieces are kept apart, and by a robot mechanism, they are brought together at the desired moment, and fired by neutrons obtained from radium-beryllium mixture".²

PARTIAL CONTROL OF THE ATOMIC ENERGY

It may be noted that the energy released in the atom bomb is only about one percent of the total energy contained in the Uranium atom. What a tremendous power it would be when a larger percentage of the energy contained within the atom comes under the *complete* control of man, passes our understanding!

THE FUTURE OF ATOMIC ENERGY

PEACETIME POSSIBILITIES

(a) *Medical and Biological By-Products*

As is well known, the medical profession has long made use of both X-rays and radium in the treatment of many diseases including cancer. After the discovery of artificial radioactivity there was considerable research upon the use of radioactive isotopes both as a means of treating

¹ "Industrial Utilization of Atomic Power in India" by M. N. Saha. *Science and Culture*, p. 88., Vol. 13, No 3, Sep. 1947.

² *Science and Culture*: p. 282, Vol. XI, No 12, June 1946: "The Atom Bomb" by M. N. Saha.

disease and as a tool for biological and medical research. Radioactive isotopes are a by-product of atomic energy. A radioisotope is an atom which gives off radiation. Artificial radioactive elements possess two very great advantages over the natural radioactive ones: namely, (a) most of the common elements can be made radioactive; (b) this radioactivity is short-lived enough so that it can be taken internally with no danger of *cumulative* effect like radium poisoning. Smaller quantities of a radioactive element can be used to trace large amounts of its inactive isotope. Consequently, the radioactive element acts in the body as a *tracer* in the detection of quantities so small as to defy analysis. The value of these radioactive isotopes in future in medicine, in "tracer" chemistry, and in many other fields of research can hardly be overestimated. They are building up, bit by bit, a new understanding of the dynamic processes of life.

(b) *Power Plants*

"Physicists believed in 1946 that the development of uranium piles for the generation of power was possible in the near future (production of electricity). Many physicists believed that such power plants might be made small enough to be installed in ocean liners but they did not see how they could be made small enough for use in automobiles or aeroplanes". (E. B., p. 88, 1947.)

HUMANITY STANDS AT THE CROSS-ROADS TODAY

"Scientists feel that all mankind stands today at the cross-roads. One road leads to an international atomic armament race certain to end in World War III and the destruction of civilization. The other road leads to the peaceful development of atomic energy for the good of all humanity". (E.B., p. 88, 1947.)

The control of atomic energy was the most important problem facing the human race today. Now energy is an energy and force is a force. Energy or force is neither good nor bad in itself. It is the use that the individual or a politician, a country or a nation is making of these forces that is the most important thing. These forces may be used for uplifting humanity, taking it a step forward in evolution and spreading peace and prosperity, or may be used for maleficent ends, without regard

to divine economy or any thought for the good of the peoples of the world, by spreading false notions about the superiority of one race over the other (pseuo-anthropology) and the wrong use of the radio and the press in instilling thoughts of hatred among the people.

OCCULTISM AND PSEUDO-OCCULTISM

It is here that we may distinguish between Theosophy or occultism and pseudo-occultism¹. Now pseudo-occultism has started spreading in the world today. It is that great danger to society that we have to be aware of and guard against. Dr. Annie Besant's views on this subject given below are very clear and illuminating. Let us calmly brood over what she says :

When a man becomès a real occultist he becomes only a force for good in the world. . . There is no true spiritual life, there is no real occultism, until the man at last recognizes that *the goal of his being is to become a force for good, and that only, in the world. . .* There is only one thing left within him, *the longing to be of service. . .* The grasping of these forces both on the physical and super-physical planes by one in whom the personality is not eliminated may become a source of danger alike to himself and others and may tend to retard the progress of the race instead of lifting it upwards. [It should be noted]. . . that suffering follows from grasping powers ere we are ready to use them, from plucking the fruit of knowledge ere it is ripe for our consumption, from striving to rule ere yet we have learnt to obey, and from endeavouring to snatch at the mighty forces of the spiritual realm until we have learnt the great lesson of the Spirit—that only by giving is the spirit shown, that only by utter abnegation is the true life realized.² (Author's italics).

¹ See also this Vol., Preface to Part I, first edition and p. 15.

² Annie Besant : *Evolution and Occultism*, Essays and Addresses, Vol. III, pp. 180-209.

THE ATOMIC BOMB: A CHALLENGE TO MAN¹

By D. D. KANGA

THE 'Mighty Atom' has become the principal topic of discussion in the world at the present day. Will the discovery and control of the atomic bomb destroy the beautiful creations of humanity or will it take humanity to a glorious and happy future? Will it prove a blessing or curse to mankind? The atomic bomb may shorten the war and hasten peace but will the peace be enduring, will man be able to keep peace? Should humanity build its social structure on the basis of fear and behave in a gentlemanly way because a Democles sword constantly threatens to fall on its head if it goes astray or should the social structure be based on the solid and broad foundation of love, freedom and justice, wisdom and compassion, arising out of a deep understanding of the laws of life, of the constitution of the *whole* man and of the *whole* universe? In the latter case there will be no danger of the terrific force, which science has placed in the hands of man, being misused by an individual or a group of individuals, by a nation or a group of nations, for their selfish interests.

The ethics of the atomic bomb is engaging the attention of scientists and statesmen, of leaders of thought and of human affairs, of war ministers and ministers of religion. Some have protested against its use and a very few have spoken in its defence. The fact that the majority of the writers have expressed profound disquiet and strong doubts about the wisdom of its use by the allies and further, the fact that some of the scientists themselves who were

¹ By courtesy of the Bombay University. (The Journal of the University of Bombay, Vol. XIV, Part III, November 1945). This Note by the author himself as Managing Editor of the Physical Science Section is reproduced here with a few alterations, and some additions beginning from the Indian Science Congress Resolution.—Ed.

concerned in the development of the atomic bomb are very uneasy over the implications of their discovery augur well for the future.

Man is on the threshold of a great change, a mighty revolution. Whether that revolution will usher in a new order of things which the needs of humanity require so badly at present in consequence of the senseless and reckless destruction of our present great sources of energy, namely, the coal mines and the oil wells and the vast forests, in the terrible war which ended in 1945, or whether the nations of the earth, intoxicated with pride and power and steeped in their lust of greed and possessions, will make use of the atomic bomb in the next war, mutually destroy themselves and bring humanity once again to the dark ages, remains to be seen. Worse than the physical atomic bombs whose power of destruction we so much dread because they are visible and tangible to us are the invisible atomic bombs of hatred, mistrust, and suspicion which humanity uses so freely with little care for their consequences. These bombs can wipe out in an hour the structures of goodwill built through generations. It is these invisible atomic bombs which are more to be dreaded than the physical atomic bombs; and if these are so dreaded then there is little likelihood of this atomic power being misused. On the other hand, this tremendous power which man is now able to control and manipulate will be used in a thousand different ways for the happiness of mankind. Let us hope that the forces of light and love and wisdom will prevail over those of darkness and selfishness and greed and such a dire calamity will be averted.

It is said that "the world so far will get but that with which it can be safely entrusted".¹ If the terrific energy locked up in the atom has come under man's control and is made available now, it means that man is put on his severest ordeal and given a chance to see whether he will rise to the great trust reposed in him. Let us be optimistic. Let us welcome the chubby beautiful little angel in our midst. Let us make an inner resolve that we shall never betray the great trust put in us. Let us pledge before our Supreme Self that we shall not abuse this power that has come in our hands. Let us have such a code of honour as doctors and lawyers and ministers of religion have and declare that we would rather sacrifice our life than misuse the power that Providence has thought fit to release for the benefit of the whole creation.

¹ S.D., I, 612.

As a result of the terrible suffering humanity has gone through since the outbreak of World War I and particularly during the last eight or ten years, an immense change unknown to man has, let us hope, come over him and made him wise and humble. The atomic bomb will bring about a complete change in warfare, in our outlook on life, in our valuation of things; so, let us hope, as a result of that, that there will be *a willing sacrifice of their sovereign rights* on the part of the "have" nations, monopolist capitalists, Big Business and vested interests; that there will be a revolutionary change in their ideas about competition; that it will be evident to them that "selfishness is a colossal failure" and that, becoming wiser, they will avoid the dire results of personal competition and go in for a universal co-operation, for a new type of competition in which there will be an earnest attempt to outdo each in the service of all. Not to support life alone but to make it more lovely will then be the aim; not to make life more lovely for one's self alone but for one's neighbours also will then be the goal.

* * * *

Since the discovery of enormous amounts of energy locked up in the atoms of the radioactive elements, the scientists have concentrated all their efforts to bring under control this atomic power and use it for industrial and other purposes in peace times. The making of the atomic bomb has shown that the secret of controlling this power has now been known to them. It is impossible to go back now and say that in view of the potentiality of the atomic bomb for great harm in the hands of the selfish—"the Cains of the human race"—researches on the industrial utilization of this tremendous power for peace times be dropped. That will not be advisable. We must face the problem boldly. The problem must be attacked on all fronts—scientific, *educational*,¹ economic, industrial, political, etc. Every possible encouragement must be given to the scientists engaged in this work to carry on their researches further. These scientists must be men and women with the very highest sense of honour and moral responsibility. Secondly, there should be a new orientation in education. The present mind-dominated system must be supplemented

¹ Campaign for the Education of the Public: Professor Albert Einstein and a group of scientists appealed on 17-11-1946 at New York for 1,000,000 dollars in public subscriptions to be used in educating the community in social implications of atomic energy and the steps necessary to avoid the destruction of civilization.

by a system which gives first place to the Spirit in man's constitution and in which mind and body become the instruments of the Spirit. The new system of education should help people to live a *whole* life and not a narrow, partial, restricted, stunted, superficial life such as the majority of the people are living now. Education must be based on spiritual foundations. That is the royal road to progress. That way lies salvation and real happiness. That way lies the solution of many a complicated and difficult problem.

* * * *

The Atomic Bomb is a challenge to man, to all the scientists and statesmen of the world, to all the religious heads of the world, to all the educationists of the world. It says: "Use me well and I shall prosper you and prove to be a blessing to mankind. Use me ill and I shall destroy you and prove to be a curse to all". What are we going to do? Accept the challenge or run away and acknowledge defeat?

The atomic bomb invention is one of the greatest triumphs of science and of the application of the scientific method. To acquire knowledge is one thing but to know how to make a good use of that knowledge is quite another thing. Shall we say that though intellectually we may be giants, spiritually we are still infants and so we are afraid to be in possession of this mighty secret and shall have nothing to do with it, suppress it, sabotage it, as so many scientific discoveries and inventions have been done before and are being done now for *another* reason—that they came in the way of the vested interests, though if they had seen the light of day, might have benefited humanity. *Should there be frustration of science?* What is the answer? The answer is an emphatic "No".

We should not forget that we are immortal spirits, fragments of the Divine and that we are not merely body and brain. Let us proceed with further researches on this atomic power and see how it could be utilized for beneficent purposes in life and raising standards of living and at the same time take measures to see that we become *spiritually* strong so that with a controlled and purified mind and emotions, with an *equal* development of heart with head, the question of the misuse of the atomic power does not arise at all. Will the Universities of the world rise to the occasion, understand their responsibilities, bring about a great reform in the

educational system so that their alumni are *spiritually* equipped, armed, and well prepared to meet the challenge the atomic bomb has thrown at them?

Control of Atomic Energy

Resolution

"The members of *The Indian Science Congress Association* assembled at its *Annual Session at Bangalore on January 5, 1946* record it as their considered opinion that any attempt to keep future atomic knowledge secret will not only fail in view of the fact that basic atomic secrets have already been disclosed, but will lead immediately to a dangerous armaments race and ultimately to a war. They are of the opinion that *the only security for humanity against the destructive use of atomic weapons is to be found in setting up an international organization which will promote the free exchange of all basic knowledge between the scientists of all nations, and control atomic energy to the extent necessary to ensure its use only for peaceful ends*". (italics mine)

* * * *

Opinions of Some Eminent Scientists

A perusal of the statements of some of the eminent scientists made in 1946-47¹ reveals the following points:

1. There is no defence against atom bombs.²
2. It is futile to keep secret the knowledge of atomic bomb manufacture as the basic atomic secrets are already known.³
3. The results of further researches on this subject must be published and made known to scientists all over the world.⁴
Science must grow in an atmosphere of freedom.
4. Scientists must refuse to carry on researches under military secrecy.⁵

¹ *Nature*, Vol. 159, No 4040, 5-4-1947, pp. 449-451.

² Einstein.

³ Einstein. Vide also Resolution above.

⁴ The principle involved in the wisdom of the ancients in withholding knowledge from the profane refers not to scientific but occult knowledge, knowledge obtained through the development of occult faculties. Vide Resolution (*supra*.)

⁵ Sir Henry Dale. See also Sir Henry Dale's address as president to the British association for the advancement of Science delivered at Dundee on August 27, 1947. (*Nature*, August 1947, pp. 280-283.)

5. Scientists must refuse to do researches for the State or industry if they are not allowed to publish the results of their researches.¹
6. International control and inspection of atomic energy plants are absolutely necessary.²

Raising this important question—a question of life and death for our civilization—above academic discussion and considering it as practical men of the world, we are forced to come to the following conclusions :

Practical Considerations

- A. That there shall be no frustration of science.
- B. That there shall be an International Body established and entrusted with the following powers :
 - (i) To raise an International World Police Force³ greater and more powerful than could be raised by any other single country in the world.

This International Force will be *one* military unit working under the authority of the International Body and belong to no one particular country or countries however great and powerful. It will not be a mixture of several separate military units from different countries existing side by side. The individual soldiers belonging to this one military unit will forget their race and nationality and develop a common language of their own—a new language and a new outlook on life and a new mentality which is globular, which considers all mankind as one family.⁴

- (ii) To use the International Force and recognised weapons and methods of war *alone*, as a punitive measure, against any aggressive nation which disregards the ruling of the International Body and attacks another nation and refuses to have its quarrels settled with that nation by resorting to arbitration.
- (iii) To use the International Force and recognised weapons and methods of war *alone*, as a punitive measure,

¹ Sir Henry Dale.

² Einstein, Sir George Thomson, Indian Science Congress Resolution, Lord Bertram Russel, Sir John Anderson.

³ See p. 334, *Freedom and Civilization*, by B. Malinowski.

⁴ Einstein, 1947. Also Sir Richard Acland in "Unser Kampf, Our Struggle, 1940.

against a nation which carries on researches on atomic energy but which does not allow its laboratories and factories to be inspected by the International Inspection Board of Control.

(iv) To permit any country in the world to carry on researches on atomic energy provided it agrees to the inspection of its laboratories and factories by an International Inspection Board of Control.

(v) To see that the atom bomb is never used in future warfare.

Ideal Arrangement

The ideal arrangement would be for each nation,

- (1) to agree to their quarrels being settled by peaceful methods of arbitration through free discussion and deliberation ;
- (2) to agree to a complete disarmament except for police and militia for the maintenance of internal peace and order ;
- (3) to agree to the abolition of war and the out-lawing of the atom bomb :
 - (a) in view of the present developments of scientific warfare ; and
 - (b) in view of the fact that we have now reached a stage of evolution in human history where the only creative function of war—the forming of larger cultural units—is no longer necessary ;¹ and finally,
- (4) to co-operate with other nations to carry on researches for the utilization of atomic energy for peaceful, domestic and industrial purposes.²

¹ B. Malinowski : *Freedom and Civilization*, p. 330.

² The atom bomb depends for its action upon a lightning-like chain reaction in which the process of nuclear fission takes place in the entire mass of material in about one ten-millionth of a second. Such a reaction cannot be used for release of energy for experimental or industrial purposes in times of peace. The rate at which nuclear fission takes place requires to be slowed down. This can be done by the denaturing of the fissionable materials. U-235 and Plutonium can be "denatured", that is, they can be mixed with some substance which has the effect of slowing down the rate at which nuclear fission can take place in these substances.

This "denaturing" of fissionable materials and the "denaturing" of salt and rectified spirit are not exactly parallel cases though in both cases the denaturing is done for industrial purposes. In the case of the former it is done to slow down the rate of nuclear fission as stated

International Outlook and Collaboration Necessary

The future is hopeful and glorious if there is international collaboration, if the scientists of all nations unite, plan and pool their resources together and give the results of their researches to the whole world. Where the politicians have failed to remove national rivalries and misunderstandings, the scientists may succeed. They have the power to bring about such a consummation, provided they become international in their outlook and as large-hearted and large-visioned as they are large-brained, so that they consider the whole world as *one* family and do everything from the *globular* point of view.

above, in the case of the latter it is done to cheapen the materials by making them tax free and unusable for edible purposes.

"Mere agreement to outlaw the atom bomb is insufficient and will not work, largely due to the fact that the development of atomic energy for peaceful purposes and the development of atomic energy for bombs are in much of their course interchangeable and interdependent. Thus, the only assurance that atomic plants would not be converted to destructive purposes would be the pledged word and good faith of each nation involved". (*The Year Book* 1947, p. 86.)

When the utilization of the atomic energy becomes a practical proposition as a result of the researches of the scientists, then most of the existing power schemes will be out of date. We do not know when that will be; twenty, thirty, fifty years hence. This fact will have to be borne in mind by those who intend going in for big schemes.

A NOTE ON OCCULT CHEMISTRY¹

BY D. D. KANGA

INTRODUCTION

THE scientist of today will be the occultist of tomorrow. It is therefore in the fitness of things that he should know something of a new branch of chemistry, called "Occult Chemistry", which has come into existence since 1895. The pioneers in this new line of research were Annie Besant and C. W. Leadbeater. They made use of a new unique method, called the occult method, and a new trained faculty, called the faculty of clairvoyance, in their investigations into the nature of the atoms of all chemical elements then known and also of others unknown to orthodox science, which they discovered for the first time. The use of this new method of investigation is of added significance today, which is supposed to be an age of atomic bombs—an age in which science has brought under control great forces of nature, but an age in which man is not morally and spiritually sufficiently advanced so that he could be safely trusted to make a good use of all those powers for the welfare of the whole of humanity.

Scientific and
Occult Methods
of Research

The scientific training and discipline, though excellent in many ways to develop certain fine qualities, has been found to be inadequate to develop character, to bring about a change of heart or a change on the psychological level.²

There is therefore the fear of power given by science being misused by man. Moreover, the present scientific method of investigation, though excellent for inquiry and research in a man-sized world, has been found to be insufficient for the astronomical world and to fail completely in the world of atoms and sub-atoms.³ It thus seems

¹ See Preface to Part I for the meaning of occultism.—Ed.

² See "The Thrill of self-Exploration", Part III of this series.—Ed.

³ Review of "Physics and Philosophy" by Sir James Jeans, *Science and Culture*, January 1944, p. 299.

that the scientific method of inquiry as well as the scientific training and discipline have been found to be inadequate for further progress in evolution and, therefore, they require to be *supplemented* by another method and another discipline which may be able to achieve both the above-mentioned objects. Fortunately for us, the ancient sages have discovered such a method, which is no other than the occult method, which fulfils *both* these objects. The beauty of this method is that the training and discipline a person has to go through to acquire the new faculty of clairvoyant investigation leads to such refinement of character, ennoblement of nature, and openness and purity of mind that the question of misuse of power for personal gain or selfish ends does not arise. In this age of atomic bombs, this is a very important consideration. At the same time, it gives a method of investigation in the superphysical and sub-atomic worlds, for which the present scientific method has been found to be inadequate. These claims of the ancient sages have been amply corroborated by the occult investigators, Annie Besant and C. W. Leadbeater, by the exemplary lives of service and sacrifice they have led and by their showing to a doubting world the possibility of developing a trained faculty of clairvoyance and their making use of it in investigations in a new branch of what has now come to be known as Occult Chemistry.

One of the aims of the two researchers in these investigations was to give proof to science that could not be challenged as fact. It may be put in their own words:

Aim of the Researchers "We wanted to take some subject in which science was advanced, and study the things that science had not discovered but was on the way to discover, and discover at some future time. We wanted to put on record from pure clairvoyant observations certain facts in nature, indubitable facts which we could examine and which we could write down and publish, so that when any of these facts should come to be discovered, a man could not deny that they had been found out by a method not used by modern science. That was the object of these investigations, and much of them has already justified itself rather sooner than we expected".¹

Another aim of these investigators was "to know just a little more of the way the Divine Mind manifests in Nature. . . . They had already received so much inspiration for noble living and service from what they knew of Theosophy, that they desired to know more of that Wisdom. It

¹ From an unpublished address by Annie Besant, 13-11-1921.

might well be said that their motto was: 'To the glory of the Grand Geometrician of the Universe and for the perfection of humanity'".¹

The investigations began, as we have stated above, in 1895 and went on through long breaks up to 1932. The first elements to be investigated were the familiar elements, Hydrogen, Oxygen and Nitrogen; their last investigation resulted in the discovery in December 1932 of a new element in the stratosphere of At. Wt. 2 ($H=1$), which was named "adyarium". All the elements known to chemists were investigated by the trained faculty of clairvoyance and some others not yet discovered by science. Not only elements but a large number of chemical compounds also, both inorganic and organic, have been examined by this method and the results of these investigations were given in the form of articles, illustrated with diagrams, by C. Jinarājadāsa from time to time in various issues of *The Theosophist*.² Mr. Jinarājadāsa was their colleague and collaborator in this work from the very beginning and has done yeoman service in the development of this subject, by putting out a number of most useful notes, implying much careful research, without which the authors could not have written the book which appeared under the name *Occult Chemistry*. Writing about the diagrams, showing the details of the construction of each element, the two authors, Annie Besant and C. W. Leadbeater, say that they owed them to the most painstaking care of Mr. Jinarājadāsa without whose aid it would have been impossible for them to have presented clearly and definitely the complicated arrangements by which the chemical elements are built up.³

What is this unique method of investigation? C. Jinarājadāsa describes it in the following words: "Their [the occult
Method of
Investigation
researchers'] method of work is unusual. They do not use mass spectroscopy in these investigations but use the faculty of clairvoyance. One power in highly trained clairvoyance is the faculty to magnify far and away beyond the capacity of the ultramicroscope. This faculty has been described in the old books on Yoga as the power to be 'infinitesimally small'. For when the observer is infinitesimally small, then what he sees appears large. This briefly is the rationale

¹ C. Jinarājadāsa, *Occult Investigations*, p. 283, T., June, 1936.

² T., Jan.-Dec., 1908; T., July, Sept., Oct., 1909; T., March, April, Aug., 1924; T., March, April, Aug., Sept., 1925; T., June, 1926; T., Oct., Nov., Dec., 1932; T., Jan., March, 1933.

³ P. 18, O.C., 2nd edition.

of clairvoyant magnification. It is not the principle of the microscope which enlarges the image of the object; on the other hand, the observer minimizes himself in consciousness so that his "size" is infinitesimally small.¹ Mr. Jinarājadāsa further explains:

"These investigations are totally different from those of the chemists and physicists in that each element is seen *in puris naturalibus*, that is to say, not under any electrical or magnetic excitation". . . .

"The chemical atoms are, therefore, observed exactly as they are, and no experiment whatsoever, except one, is made upon them to change their natural function. This exception is due to the fact that each atom is whirling rapidly, and therefore it is necessary to lessen somewhat its movement so that the various parts of the elements can be clearly seen as to draw them. The work of lessening the movement is not dissimilar to that of making a person who swings a rope lighted at one end, thus making a complete circle of light, to move his arm slower so that it is possible to see the end of the lighted rope as it makes one point of light, and not a circle." (P. 467, T., July 1913.) This is a very special feature of this method.

The results of clairvoyant magnifications of the different elements by the method above described reveal that the atoms of the elements have definite inner and outer structures.

Families of Elements

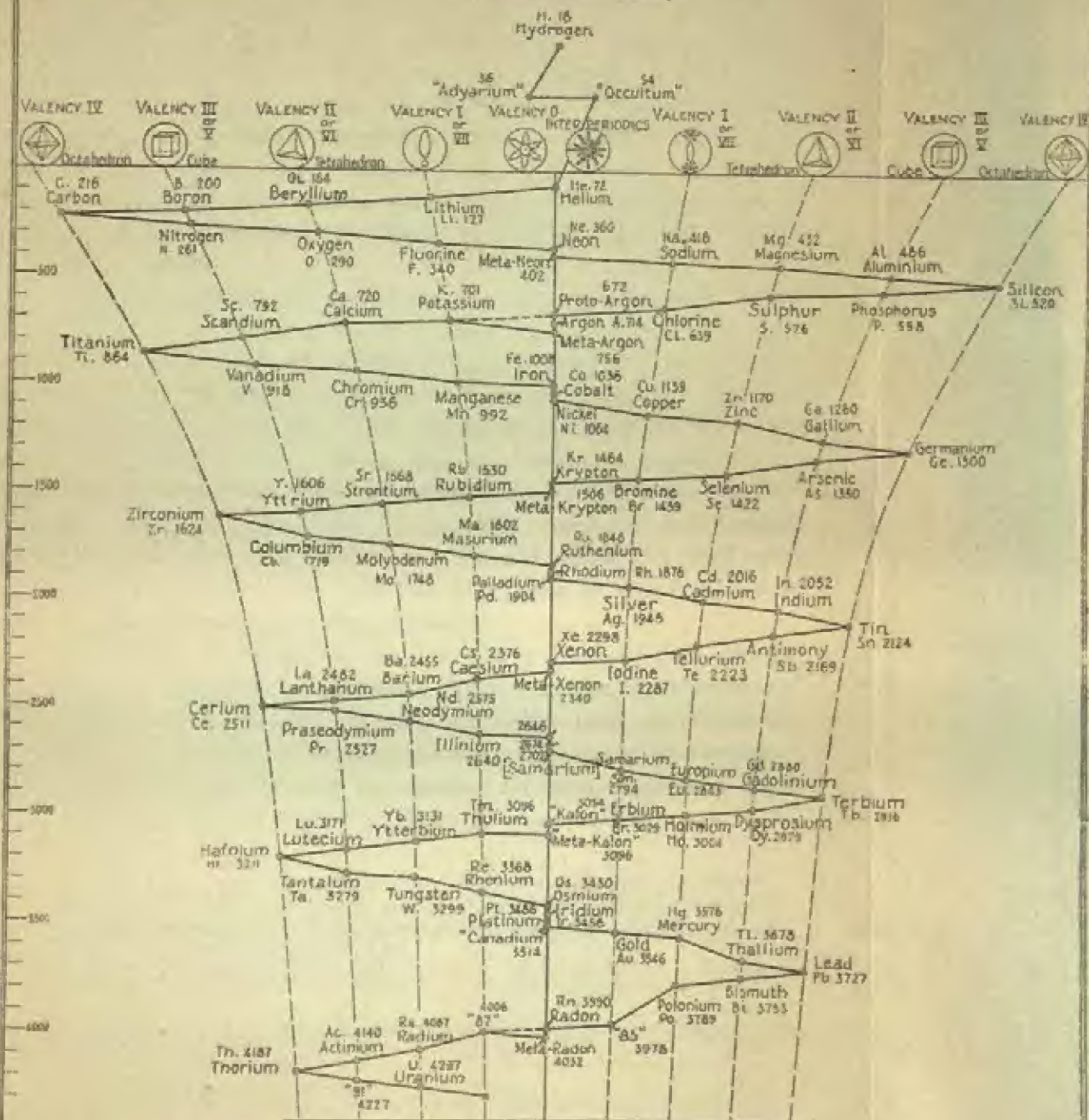
With a few exceptions (Hydrogen, "Adyarium", "Occultum", Helium, Nitrogen, Oxygen, Fluorine, Titanium and Zirconium), the elements fall into seven groups or families according to the shape or form they present externally. The word "family" will be used for these groups to distinguish them from those of orthodox science. They are described as: (a) "Spikes" (monovalent); (b) "Dumb-Bells" (monovalent) (there are two different families of monovalent elements); (c) Tetrahedra (divalent); (d) Cubes (trivalent); (e) Octahedra (tetravalent); (f) "Crossed-Bars" (transitional elements); and (g) "Stars" (neutral). The names given to them by the clairvoyant investigators are significant.² See Crookes diagram 1, facing p. 331 for these external forms.

¹ P. 99, T., October 1932.

² "One might ask how were the investigators certain to hit the metal and not the impurity. . . . In the case of a mixture, or compound, as with alloys, the proportion of the atoms is definite and can be recognized at a single glance, just as when one sees cavalry pass, one can always pick out the horses and the men, or in a herd of cattle and buffaloes, the sheep, the

THE PERIODIC LAW

(after Crookes)



The number affixed to an element is the number of "Atm" (the ultimate physical particles of which matter is constituted) which compose the element.

Isotopes are not given.

Elements not yet discovered by chemists: 36, 54, 86, 118, 150, 182, 210, 242, 274, 306, 338, 370, 402, 434, 466, 498, 530, 562, 594, 626, 658, 690, 722, 754, 786, 818, 850, 882, 914, 946, 978, 1010, 1042, 1074, 1106, 1138, 1170, 1202, 1234, 1266, 1298, 1330, 1362, 1394, 1426, 1458, 1490, 1522, 1554, 1586, 1618, 1650, 1682, 1714, 1746, 1778, 1810, 1842, 1874, 1906, 1938, 1970, 2002, 2034, 2066, 2098, 2130, 2162, 2194, 2226, 2258, 2290, 2322, 2354, 2386, 2418, 2450, 2482, 2514, 2546, 2578, 2610, 2642, 2674, 2706, 2738, 2770, 2802, 2834, 2866, 2898, 2930, 2962, 2994, 3026, 3058, 3090, 3122, 3154, 3186, 3218, 3250, 3282, 3314, 3346, 3378, 3410, 3442, 3474, 3506, 3538, 3570, 3602, 3634, 3666, 3698, 3730, 3762, 3794, 3826, 3858, 3890, 3922, 3954, 3986, 4018, 4050, 4082, 4114, 4146, 4178, 4210, 4242, 4274, 4306, 4338, 4370, 4402, 4434, 4466, 4498, 4530, 4562, 4594, 4626, 4658, 4690, 4722, 4754, 4786, 4818, 4850, 4882, 4914, 4946, 4978, 5010, 5042, 5074, 5106, 5138, 5170, 5202, 5234, 5266, 5298, 5330, 5362, 5394, 5426, 5458, 5490, 5522, 5554, 5586, 5618, 5650, 5682, 5714, 5746, 5778, 5810, 5842, 5874, 5906, 5938, 5970, 6002, 6034, 6066, 6098, 6130, 6162, 6194, 6226, 6258, 6290, 6322, 6354, 6386, 6418, 6450, 6482, 6514, 6546, 6578, 6610, 6642, 6674, 6706, 6738, 6770, 6802, 6834, 6866, 6898, 6930, 6962, 6994, 7026, 7058, 7090, 7122, 7154, 7186, 7218, 7250, 7282, 7314, 7346, 7378, 7410, 7442, 7474, 7506, 7538, 7570, 7602, 7634, 7666, 7698, 7730, 7762, 7794, 7826, 7858, 7890, 7922, 7954, 7986, 8018, 8050, 8082, 8114, 8146, 8178, 8210, 8242, 8274, 8306, 8338, 8370, 8402, 8434, 8466, 8498, 8530, 8562, 8594, 8626, 8658, 8690, 8722, 8754, 8786, 8818, 8850, 8882, 8914, 8946, 8978, 9010, 9042, 9074, 9106, 9138, 9170, 9202, 9234, 9266, 9298, 9330, 9362, 9394, 9426, 9458, 9490, 9522, 9554, 9586, 9618, 9650, 9682, 9714, 9746, 9778, 9810, 9842, 9874, 9906, 9938, 9970, 10002, 10034, 10066, 10098, 10130, 10162, 10194, 10226, 10258, 10290, 10322, 10354, 10386, 10418, 10450, 10482, 10514, 10546, 10578, 10610, 10642, 10674, 10706, 10738, 10770, 10802, 10834, 10866, 10898, 10930, 10962, 10994, 11026, 11058, 11090, 11122, 11154, 11186, 11218, 11250, 11282, 11314, 11346, 11378, 11410, 11442, 11474, 11506, 11538, 11570, 11602, 11634, 11666, 11698, 11730, 11762, 11794, 11826, 11858, 11890, 11922, 11954, 11986, 12018, 12050, 12082, 12114, 12146, 12178, 12210, 12242, 12274, 12306, 12338, 12370, 12402, 12434, 12466, 12498, 12530, 12562, 12594, 12626, 12658, 12690, 12722, 12754, 12786, 12818, 12850, 12882, 12914, 12946, 12978, 13010, 13042, 13074, 13106, 13138, 13170, 13202, 13234, 13266, 13298, 13330, 13362, 13394, 13426, 13458, 13490, 13522, 13554, 13586, 13618, 13650, 13682, 13714, 13746, 13778, 13810, 13842, 13874, 13906, 13938, 13970, 14002, 14034, 14066, 14098, 14130, 14162, 14194, 14226, 14258, 14290, 14322, 14354, 14386, 14418, 14450, 14482, 14514, 14546, 14578, 14610, 14642, 14674, 14706, 14738, 14770, 14802, 14834, 14866, 14898, 14930, 14962, 14994, 15026, 15058, 15090, 15122, 15154, 15186, 15218, 15250, 15282, 15314, 15346, 15378, 15410, 15442, 15474, 15506, 15538, 15570, 15602, 15634, 15666, 15698, 15730, 15762, 15794, 15826, 15858, 15890, 15922, 15954, 15986, 16018, 16050, 16082, 16114, 16146, 16178, 16210, 16242, 16274, 16306, 16338, 16370, 16402, 16434, 16466, 16498, 16530, 16562, 16594, 16626, 16658, 16690, 16722, 16754, 16786, 16818, 16850, 16882, 16914, 16946, 16978, 17010, 17042, 17074, 17106, 17138, 17170, 17202, 17234, 17266, 17298, 17330, 17362, 17394, 17426, 17458, 17490, 17522, 17554, 17586, 17618, 17650, 17682, 17714, 17746, 17778, 17810, 17842, 17874, 17906, 17938, 17970, 18002, 18034, 18066, 18098, 18130, 18162, 18194, 18226, 18258, 18290, 18322, 18354, 18386, 18418, 18450, 18482, 18514, 18546, 18578, 18610, 18642, 18674, 18706, 18738, 18770, 18802, 18834, 18866, 18898, 18930, 18962, 18994, 19026, 19058, 19090, 19122, 19154, 19186, 19218, 19250, 19282, 19314, 19346, 19378, 19410, 19442, 19474, 19506, 19538, 19570, 19602, 19634, 19666, 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THE PERIODIC LAW

1869-1911



THE PERIODIC LAW OF CHEMISTRY
BY DR. D. M. MENDELÉEV
PUBLISHED BY THE
IMPERIAL UNIVERSITY OF S. PETERSBURG
1869-1911

The Crookes diagram of the Periodic Law of the elements was found to be not only the simplest but also the most graphic and descriptive of the facts observed and of the greatest use to the researchers in their investigations.¹ This diagram in a *modified* form, as prepared by Jinarājādāsa from the results of clairvoyant investigations, is given here. A study of this diagram will be very illuminating. The classification of the elements in this diagram is based on the total number of the *ultimate physical atoms* called "Anu" contained in each element. The word "Anu" comes from the Sanskrit which means the ultimate particle of physical matter. Hydrogen, the lightest of all known elements, is stated as having 18 "Anu".

The Anu consists of two varieties, positive and negative, one being the mirror image of the other. (See pp. 287-88, Chemistry monograph). "This ultimate physical atom can scarcely be said to be a "thing", though it is the material out of which all things physical are composed. It is formed by the flow of the life-force² and vanishes with its ebb. When this force arises in "space"³ . . . atoms appear; if this be artificially stopped for a single atom, the atom disappears; there is nothing left. Presumably, were that flow checked but for an instant, the whole physical world would vanish, as a cloud melts away in the empyrean. It is only the persistence of that flow⁴ which maintains the physical basis of the universe".⁵

The occult investigators have thrown a flood of light on the constitution of matter. Their investigations showed that the chemical elements are bodies built up of different numbers of fundamental units of physical matter arranged in a variety of ways. Science too reached the same conclusion a few years later when it said that the chemical elements were seen to be

goats. In the case of impurities (such as carbon in a London atmosphere) the proportion is always insignificant and there one might pick out the impurity as one might differentiate between the sheep in the flock and the shepherd or the dogs". (P. 103, T, October 1909.)

¹ See the previous monograph on Chemistry for Crookes pictures of the Genesis of Elements.

² This life-force is known to Theosophists as Fohat, the force of which all the physical plane forces—electricities—are differentiations.

³ When Fohat "digs holes in space".

⁴ The first life-wave, the work of the Third Logos. See diagram 7, p. 287, Chemistry monograph, this Part.

⁵ O.C., pp. 21-22.

bodies built up of electrons in varying number and probably in varying arrangements. Modern science postulates the neutron, the proton, and the electron as the ultimate and fundamental units of matter.¹

The fundamental difference between the methods of attack of the occult and scientific investigators lies in the fact that whereas the occultists with the help of their trained faculty of clairvoyance, actually see the structures, both inner and outer, of the atoms and molecules, the scientists are not able to do so even with the help of the most powerful ultra-microscope, for atoms and molecules are far too small to allow visual microscopic observation. "Finding themselves unable to look directly into the molecule or the atom, physicists have been forced to develop means for probing from the outside, or for blowing up the atom to see what comes out".² Under the circumstances the scientific investigators cannot know what are the actual structures of atoms, whereas the occult investigators simply slow down the whirling motion of the atoms so as to observe their structures and draw them, just as one can draw the movements of a racehorse going over a hurdle in a slow motion picture on a screen.

The results of these clairvoyant investigations show that there are three more sub-states of matter between the gaseous and atomic states. Over and above the three known states of physical matter, namely, solid, liquid and gaseous recognized by science, there are four other states of matter. They are called etheric,³ (fourth stage), super-etheric, (third stage), sub-atomic (second stage), and atomic (first stage). When one reaches the atomic state, one reaches the extreme limit of physical matter.⁴ (Diag. 2).

These ultimate physical particles of matter are all alike, no matter from what source they are derived. They are positive and negative, one the exact mirror image of the other; they are the "Anu". The physical atom is seen as being made of seven finer whorls and three coarser whorls, forming between them a caduceus-like form in the middle. "Each of the finer whorls is formed of seven yet finer ones, set successively at

¹ Future investigations might be directed to finding out the relationship between the "anu" (the ultimate physical atom of Occult Chemistry) and the neutron, the proton, and the electron (the ultimate units of matter of Modern Science).

² *Frontiers of Science*, by Chase, p. 165.

³ This is not the Aether of Space.

⁴ See also p. 294, this Part.

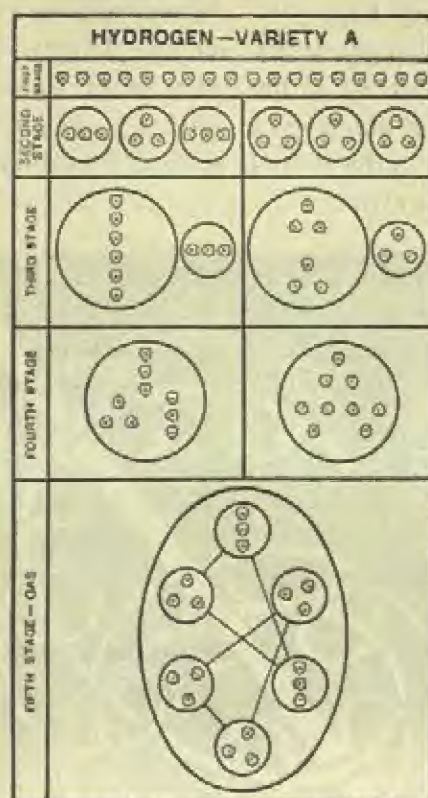


DIAGRAM 2

right angles to each other, each finer than its predecessor ; these we call spirillae.¹ (Diag. 3) . . . Each spirilla is animated by the life force of a plane, and four are at present normally active, one for each round.² Their activity in an individual may be prematurely forced by yoga practice ". . . . " In the three whorls flow currents of different electricities ; the seven vibrate in response to etheric waves of all kinds—to sound, light, heat, etc. ; they show the seven colours of the spectrum ; give out the seven sounds of the natural scale ; respond in a variety of ways to physical vibration—flashing, singing, pulsing bodies, they move incessantly, inconceivably beautiful and brilliant. . . . The atom is a sun in miniature in its own universe of the inconceivably minute. Each of the seven whorls is connected with one of the Planetary Logoi,

¹ For further particulars about spirillae see F.P.T., 195, also O.C., pp. 22-23 ; also *A Study in Consciousness*, by Annie Besant, pp. 28, 29, 103, 109, 110, 146, 218, 240.

² See for "round" monograph on Geology, Part I.

so that each Planetary Logos has a direct influence playing on the very matter of which all things are constructed. It may be supposed that the three, conveying electricity, a differentiation of Fohat, are related to the Solar Logoi".¹ These atoms go to build up our physical bodies. How closely related are we to the Solar Logos and Planetary Logoi will be seen from this picture of the atom.²



DIAGRAM 3

The *rationale* for the SIMILARITIES OF PROPERTIES occurring in the *same group*, say, for example, the Dumb-Bell Group, between chlorine, bromine and iodine which are monads, diamagnetic and negative, on the one hand and of sodium, copper and silver which are also monads and diamagnetic but positive, on the other, is brought out in diagram 4. See also Diagram 1 and Table 1 which show where these elements occur.

¹ See also diagrams 7 and 8, Chemistry monograph, this Part.

² See also the monograph on Astrology, Part IV.

TABLE I

Families	IV Octa- hedra	III Cube	II Tetra- hedra	I "Spikes"	0 "Stars"	VIII "Crossed Bars"	I "Dumb- Bells"	II Tetra- hedra	III Cube	IV Octa- hedra
					H "Ad" (1) (2)	"Oc" (3)				
	C (8)	B (7)	Be (6)	Li (5)	He (4)					
		N (9)	O (10)	F (11)	Ne (12)		Na (13)	Mg (14)	Al (15)	Si (16)
	Ti (24)	Sc (23)	Ca (22)	K (21)	A (20)		Cl (19)	S (18)	P (17)	
		V (25)	Cr (26)	Mn (27)		Fe (28) Co (29) Ni (30)	Cu (31)	Zn (32)	Ga (33)	Ge (34)
	Zr (42)	Y (41)	Sr (40)	Rb (39)	Kr (38)		Br (37)	Se (36)	As (35)	
		Nb (43)	Mo (44)	Ma (45)		Ru (46) Rh (47) Pd (48)	Ag (49)	Cd (50)	In (51)	Sn (52)
	Ce (60)	La ¹ (59)	Ba (58)	Cs (57)	Xe (56)		I (55)	Te (54)	Sb (53)	
		Pr (61)	Nd (62)	Il (63)		X (64) ² Y (65) Z (66)	Sm (67)	Eu (68)	Gd (69)	Tb (70)
	Hf (78)	Lu ¹ (77)	Yb (76)	Tm (75)	Ka (74)		Er (73)	Ho (72)	Dy (71)	
		Ta (79)	W (80)	Re (81)		Os (82) Ir (83) Pt (84) "Canadium" (85)	Au (86)	Hg (87)	Tl (88)	Pb (89)
	Th (97)	Ac (96)	Ra (95)	(94)	Rn (93)		(92)	Po (91)	Bi (90)	
		Pa (98)	U (99) ³							

¹ According to the occult investigators the *rare earth elements*, beginning from Lanthanum (La₅₉) and ending with Lutecium (Lu₇₇), fall into five different families, as shown above, in consonance with their external shapes. All these elements are underlined. Orthodox science places them all in one group, namely, the 3rd Group. (See Table 2, facing p. 347.)

² The three new elements X-, Y-, Z- Interperiodics, discovered by the clairvoyant investigators in 1909, fall naturally and beautifully in the vacant group as shown above and make the whole table more symmetrical.

³ The numbers below the symbols are serial numbers and show the total number of chemical elements, according to occult investigators, to be 99. (*vide infra*).

Sodium seems to be the ground plan for the whole group. This shows the Logos at work in the building of the chemical elements, and "how He builds from an 'ancestral type' as Crookes suggests".¹

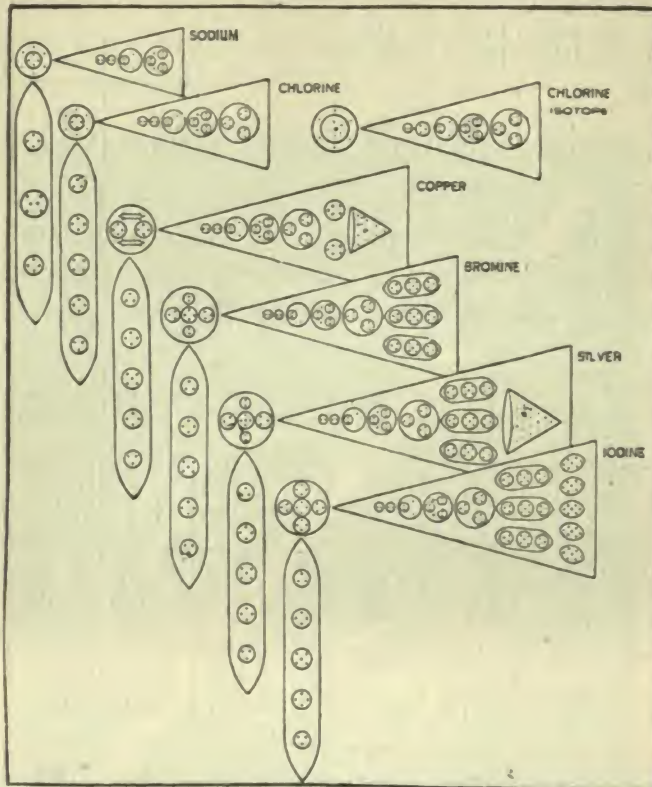


DIAGRAM 4

THE ALLOCATION OF THE RARE-EARTHS

A reference to Table I will show that the rare earths which have been underlined, beginning with Lanthanum (La) and ending with Lutecium (Lu), are distributed by the occult investigators according to their clearly marked shapes among the following five different families: "Spikes", "Dumb-Bells", Tetrahedra, Cube and Octahedra. There has been a difficulty in the allocation of the Rare Earths in the Periodic Law Classification. B. Brauner who has made a special study of the subject has put forward

¹ C. Jinarājadāsa, F. P. T., (1938 edition), pp. 261-62. O. C., pp. 34-40.

The third edition of *Occult Chemistry*, by Annie Besant and C. W. Leadbeater, edited by C. Jinarājadāsa which gives a comprehensive and elaborate account of this fascinating subject of the building of chemical elements, profusely illustrated, will be published not before long.—Ed.

"the Asteroid theory of the rare earths", grouped them all together and placed them in the 3rd Group and 6th (long) Period. (See Table 2). The occult investigators have thus been able to allocate the rare earths to their proper families to which they naturally belong according to the shapes of their outer structure. This is one important feature of this new branch of Chemistry.

THE ANOMALOUS POSITION OF FOUR PAIRS OF ELEMENTS IN THE PERIODIC LAW CLASSIFICATION

A reference to Table 2 will show that the order assigned to the elements has been departed from that of the atomic weights in four instances. The four pairs of elements are: argon and potassium, cobalt and nickel, tellurium and iodine, and, thorium and protoactinium. In each case the order, as determined by the atomic weights, is reversed so that these elements may fall into the places in the Periodic Table to which their properties rightly assign them. It was Mendeléeff himself who assigned these positions in the case of the first three pairs of elements, for he believed that subsequent accurate re-determinations of their atomic weights would bring them in the right order in the Periodic Table. But this hope of his has not been fulfilled.¹ The clairvoyant investigations, however, show no anomaly in these pairs of elements as the following table in the last column shows:

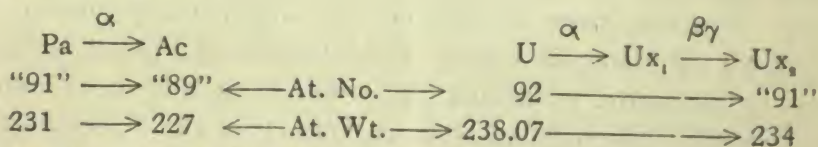
(Name of the Element)		(Atomic Weight)	(Atomic Number)	(Number of "Ann" ¹)
(1)	"Proto-Argon" ...	37.33	18	672
	Argon ...	39.944	18	714
	Potassium ...	39.096	19	701
(2)	Cobalt ...	58.94	27	1036
	Nickel ...	58.69	28	1064
(3)	Tellurium ...	127.61	52	2223
	Iodine ...	126.92	53	2287
(4)	Thorium ...	232.12	90	4187
	Protoactinium ...	231 ²	"91"	4227

¹ Table 3, pp. 348-50. Diagram 1, facing p. 331.

² Mellor, *Modern Inorganic Chemistry*, p. 118, 1941 edition.

The element "Proto-Argon" is a very rare variety of Argon and was discovered by the clairvoyant investigators as early as 1908 along with other elements mentioned further on. This is the true argon and, with its At. Wt. 37.33 ($H=1$) and 672 "Anu", comes in the right place with regard to Potassium.¹

"91" is given two different atomic weights according as it is the first starting element in the disintegration of the Actinium series when its At. Wt. is given as 231 and is then called Protoactinium (Pa), which gives, by the expulsion of one alpha particle, Actinium of At. Wt. 227 and At. No. "89"; or, it is supposed to be one of the products in the disintegration of the Uranium series when its At. Wt. is given as 234 and is called Ux_1 , thus:



Are Pa (91) of At. Wt. 231 and Ux_2 (91) of At. Wt. 234 one and the same element?

Protoactinium (Pa), (At. Wt. 231 and At. No. 91) comes after Thorium (Th), (At. Wt. 232. 12 and At. No. 90), which is anomalous. Therefore "91" is probably Ux_2 , with At. Wt. 234. The At. Wt. of "91", according to clairvoyant investigations, is 234.833 ($H=1$).²

THE DISCOVERY OF NEW ELEMENTS

We now come to the most important feature of occult investigations—namely, the discovery of new elements, of which some are confirmed by science and some not yet.

Elements not yet discovered by chemists are: "Adyarium", "Occultum", X-Inter-periodic, Y-Inter-periodic, "Kalon" and "meta-Kalon". These are put in italics in Table 3, pp. 348-350.

¹ In this connection it is worth while noting the following passage in the article on Isotopes and Atomic weights occurring on p. 729, Vol. 12, in the "Encyclopaedia Britannica" (1947). This view seems to be a corroboration of what the occult investigators have stated:

"The anomalies shown by those elements in the periodic table are now open to the simplest explanation. Thus Argon, in which the heavier of two isotopes predominates, has a greater mean weight than potassium, in which the reverse is the case. The same explanation applies to cobalt and nickel, tellurium and iodine".

² See Table 3.

TABLE 2—THE PERIODIC SERIES OF THE ELEMENTS¹
(Atomic numbers are given in brackets after the symbol of the element)

PERIODS	GROUP I A	GROUP II B	GROUP III B	GROUP IV B	GROUP V B	GROUP VI B	GROUP VII B	GROUP VIII	GROUP 0
I (Short)	H (1) 1.0081								He (2) 4.003
II (Short)	Li (3) 6.94	Be (4) 9.02	B (5) 10.82	C (6) 12.01	N (7) 14.008	O (8) 16.00	F (9) 19.00		Ne (10) 20.183
III (Short)	Na (11) 22.997	Mg (12) 24.32	Al (13) 26.97	Si (14) 28.06	P (15) 31.02	S (16) 32.06	Cl (17) 35.457		A (18) 39.944
IV (Long)	K (19) 39.096 Cu (29) 63.57	Ca (20) 40.08 Zn (30) 65.38	Sc (21) 45.10 Ga (31) 69.72	Ti (22) 47.90 Ge (32) 72.60	V (23) 50.95 As (33) 74.91	Cr (24) 52.01 Se (34) 78.96	Mn (25) 54.93 Br (35) 79.916	Fe (26) 55.84 Co (27) 58.94 Ni (28) 58.69	Kr (36) 83.7
V (Long)	Rb (37) 85.48 Ag (47) 107.88	Sr (38) 87.63 Cd (48) 112.41	Y (39) 88.92 In (49) 114.76	Zr (40) 91.22 Sn (50) 118.70	Nb (41) 92.91 Sb (51) 121.76	Mo (42) 95.95 Te (52) 127.61	Ma (43) ² — I (53) 126.92	Ru (44), Rh (45) 101.7 102.91 Pd (46) 106.7	Xe (54) 131.3
VI (Long)	Cs (55) 132.91	Ba (56) 137.36	La (57) 138.92 Ce (58) 140.31 Pr (59) 140.92 Nd (60) 144.27 II (61) ³ — Sm (62) 150.43 Eu (63) 152.0 Gd (64) 157.3 Tb (65) 159.2 Dy (66) 162.46 Ho (67) 163.5 Er (68) 167.2 Tm (69) 169.4						
VII			Yb (70) 173.04 Lu (71) ⁴ 175.0 Hg (80) 200.61 Ra (88) 226.05	Hf (72) 178.6 Ta (73) 180.88 Pa (91) 231 Th (90) 232.12	W (74) 183.92 U (92) ⁷ 238.07	Re (75) 186.92 —(85) ⁵	Os (76) 190.2 Ir (77) 193. Pt (78) 195.23		Rn (86) 222

¹ Mellor, Modern Inorganic Chemistry, 1941 Edition.

² Maseurium (43) to be called Technetium (Te) from the Greek artificial in recognition of the fact that Technetium is the first artificially made element (*Nature*, p. 24, 4-1-47).

³ Ilinium (61): Research in the study of the radioactive fission products of the uranium pile. Among the many scientifically important results was the clear identification of an isotope of element 61, with a half-life of 37 years. It is formed by the β -disintegration of a neodymium isotope with half life of 11 days and decays into a stable samarium isotope. (*Nature*, p. 9, 4-1-47).

⁴ Lutecium (71): to be called Cassiopeium (Cp). (*Nature*, p. 10, 4-1-47).

⁵ (85): Isotopes of element (85) occur in all three natural radioactive series (radium, thorium, and actinium). (Karlik and Bernett). Element "85" to be named 'Astatine', a Greek word meaning unstable; Astatine is, in fact, the only halogen without stable isotopes. (*Nature*, p. 24, 4-1-47).

⁶ Element (87) to be named 'Francium' (symbol Fr). (*Nature*, p. 10, 4-1-47).

⁷ The trans-uranium group:

Neptunium (Np), 239, (93).
Plutonium (Pu), (238 short life; 239 long life) (94).
Americium (Am), (95).
Curium (Cm), (96).

⁸ "The Making of the Missing Chemical Elements" by Prof. F. A. Paneth. (*Nature*, pp. 8-10, 4-1-47).



It will be seen from the Table that each neutral gas has its "meta" variety. This was noted by the investigators in 1907. "This may be called an isotope, but the structure of each meta variety is exactly similar, consisting, in fact, of an addition of 42 Anu in each neutral gas to make its meta variety. There must therefore be a definite relation between the normal variety and its meta kind. The meta variety of Radon is heavier than "87" which follows it on diagram 1."¹

The discovery in 1909 of three new elements in the 8th group among the "rare earths" which the investigators have named X-, Y-, and Z-, Interperiodic (At. Wts. 147, 148.55, and 150.22 respectively when $H=1$), occurring between the Ru, Rh, Pd group and Os, Ir, Pt group (Table 1). There are three vacant spaces in the 8th Group and these new elements fall naturally and beautifully in these positions; the discovery of these elements, again, makes the group and the whole periodic table more symmetrical. (*vide supra*). This group has not yet been discovered by Science. The existence of this group was speculated upon by C. Jinarājādāsa. (See *Occult Chemistry*, pp. 16-17).

The discovery of an *isotope* of an element for the first time, for example, of Neon in 1908 by Besant and Leadbeater which was afterwards confirmed by Aston in 1913. The term 'isotope' was not used by them since it was coined by Soddy only in 1910. It was called meta-Neon by both groups of investigators.

The discovery in 1908 of proto-argon (*vide supra*) and of meta-radon (meta-niton), which are not yet confirmed by science.

The discovery in 1908 of meta-argon, meta-krypton, and meta-xenon; these have been confirmed by science subsequently as isotopes, with this difference that whereas the isotopes of argon, krypton and xenon, according to orthodox science, are respectively 3, 6, and 9.² (Mellor) the meta-variety of each of these three neutral gases is only one, with a constant difference of 42 "Anu" between it and the normal variety.

The discovery in 1907-1908 of "Kalon", a heavy gas in air of At. Wt. 169.66 ($H=1$) and of "Meta-Kalon" of At. Wt. 172 ($H=1$), the number of anu of the two being respectively, 3054 and 3096, difference 42 anu; these are not yet discovered by science.

¹ T., July 1933, p. 470.

² The Isotopes of Argon in order of abundance are: 40, 36, 38.

do.	Krypton	do.	: 84, 86, 82, 83, 86, 78,
do.	Xenon	do.	: 129, 152, 131, 134, 136, 120, 128, 126, 124,

The discovery in 1908 of Platinum B, now called "Canadium" of At. Wt. 191.22 ($H=1$). It is not yet described in Mellor's *Modern Inorganic Chemistry*, revised by Parkes and Mellor, 1941. "It is not an isotope of Platinum but is a distinct metal, as distinct from Platinum as Platinum is from Iridium. This metal has lately been isolated by some mineralogists, and the term "Canadium" has been given to it" because it was discovered in Canada.

The discovery in 1895 of a new element in air of At. Wt. 3 ($H=1$); it was described and illustrated in *The Theosophist* in 1908; it was named "Occultum" in 1907. Aston has isolated a stable isotope of Helium of mass 3 (31-10-1942). There is also an Isotope of H. of At. Wt. 3.²

The discovery and recording in 1909 of three new elements, Masurium, Rhenium, and "87", of At. Wts. 100.11, 187.11, and 222.55 respectively, ($H=1$). All these three have been subsequently discovered and confirmed by science. The element of At. No. 87 was discovered by science, spectroscopically in 1931.³ It is now proposed to call "87" Francium [symbol Fr]. (p. 10, *Nature*, 4-1-1947.)

There were two vacant spaces below Manganese in Group VII A of At. Nos. 43 and 75 upto 1925. Mosley's work confirmed the reality of these gaps corresponding to atomic numbers 43 and 75. Masurium and Rhenium were discovered spectroscopically in 1925 by Noddack and Tacke by examining the X-ray spectra of concentrates from certain platinum ores and columbite. (Mellor's "Modern Inorganic Chemistry," revised edition, 1941, p. 796). The At. Wt. of Masurium has not yet been determined by science as it is found in very small quantities. At. No. 43 has been assigned to it. In accordance with occult investigations as shown above, Masurium fits in beautifully in this position. Rhenium has been assigned At. No. 75 and its At. Wt. has been found to be 186.92 (Mellor). Rhenium, too, fits in beautifully in this position, as is evident by a glance at the Tables. (*Vide infra*.)

The discovery in 1932 of a new element "85"; this was described and illustrated in *The Theosophist*, November 1932. The *London Times* describes a new element of the same Atomic Number in its issue of 7-7-1943 and calls it Anglo-Helvetium. A new element of Atomic Number 85, to be called astatine (At.) is described on p. 24, *Nature*, 4-1-47.

¹ T., p. 357, December 1932, and announced in the mineralogical magazine, 16.

² See also T., pp. 228-9, July 1909.

³ These are described and illustrated in T., p. 99, October 1932.

The discovery in 1909 of a new element, Illinium of At. Wt. 146.66 ($H=1$), containing 2640 Anu, which would bring it in the vacant space of Atomic Number 61 (see table and diagram). It is confirmed by science. The At. No. assigned to it is 61 but its At. Wt. is not yet given.¹ (*Vide infra*.)

The discovery in 1932 (December) of a new element, in the stratosphere, of At. Wt. 2 ($H=1$). It is named "Adyarium" by the Occult Investigators; this new element is not yet confirmed by science.² There is an Isotope of H. of At. Wt. 2.

* * * * *

What is the total number of the Chemical Elements ?	The clairvoyant investigators have found that there are 99 distinct elements and not 92 as stated by orthodox science. This figure does not include any isotopes, nor the meta-variety of the neutral gases. ³ This number is now raised to 96 if we include the four transuranium elements.
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The difference of seven more elements is due to the inclusion of the following elements discovered by the occult investigators, not yet discovered by science: (1) "Adyarium", (2) "Occultum", (3) "X-Interperiodic", (4) "Y-Interperiodic", (5) "Z-Interperiodic", (6) "Kalon", and (7) "Canadium".

It was thought after Mosely (1914) that the number of chemical elements cannot exceed 92. Prof. Narlikar has gone so far as to show mathematically that there can be no more than 92. It is stated that according to the theories of configuration of the atom there can exist in the universe only 92 elements and no more than 92. "Clairvoyant investigators do, however, record the fact that there are more than 92", as stated above. This is a fruitful subject for research.

Another fruitful subject for research is the following: There are no vacant spaces between the atomic numbers 1 and 2, 61 and 62, 68 and 69, and 78 and 79. A glance at table 3 will show that clairvoyant investigators place the elements discovered by them and not yet discovered by science between the numbers given above; for example, "Adyarium" and "Occultum" between 1 and 2, the 3rd Interperiodic group (X-, Y-, Z-, interperiodics) between 61 and 62, "Kalon"

¹ T., p. 456, July 1909.

² T., p. 361, December 1932.

³ See tables 1 and 3. See also T., July 1933, p. 472.

and "Meta-Kalon" between 68 and 69, and "Canadium" between 78 and 79.¹

In the light of recent scientific investigations, the total number of elements would exceed 92 if we include the artificially produced radio-active elements. Fermi has obtained two new artificial radio-elements from Uranium. These will have atomic numbers of 93 and 94. They are now known as Neptunium (93) and Plutonium (94). Plutonium is used as the main charge in the making of atom bombs. Dr. Glenn T. Seaborg of the California University has recently announced the discovery of two other new elements Americium and Curium² which he has designated as numbers 95 and 96 in numerical order of classification, "of obvious importance from the standpoint of atomic energy". It will not be surprising that as a result of the most intense and energetic investigation of the subject in this direction, the number of artificially produced radio-active elements will increase and multiply to an enormous extent. The number has already grown to a big figure.

THE NEGATIVE HYDROGEN ION

It is a new chemical element discovered by S. Chandrasekhar, an astrophysicist, in California. It is a negatively charged hydrogen ion.³ Our ordinary hydrogen is neutral. It is a gas not known on earth. It is present in the solar atmosphere. The discovery of this new element is considered by Sir C. V. Raman⁴ to be as great as that of helium in the sun by Sir Norman Lockyer.

This negatively charged hydrogen may be represented as shown in diagram 5.

In 1, the two electrons are on the same orbit while in 2, they are on separate orbits as in Helium (4). In both 1 and 2, a proton (+) is in the nucleus. In 3, a neutron (neutral) is in the nucleus and there is one electron (—) only surrounding it. Any one of these three may be a negatively charged hydrogen ion. In H, the proton is in the nucleus and

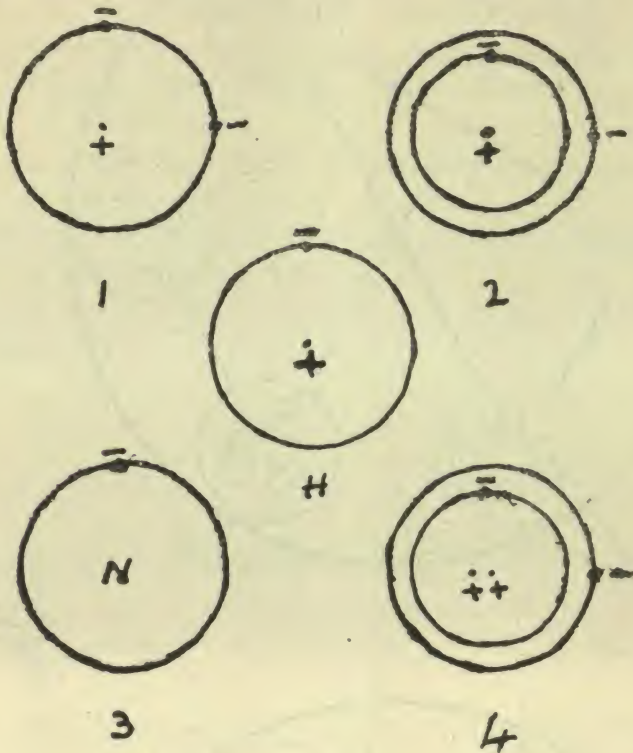
¹ See Table 3, pp. 348-350.

² *Nature*, pp. 8 and 24, 4-1-47.

³ *Ap. J.*, (Astrophysical Journal), 100, 176, 1944; 102, 223, 1945; 104, 430, 1946.

⁴ Address by Sir C. V. Raman at the Patna Sessions of the Indian Science Congress on January 2, 1948.

an electron going round it, thus making it neutral. This is the ordinary hydrogen atom.



1, 2, 3, - A NEGATIVELY CHARGED
HYDROGEN ATOM

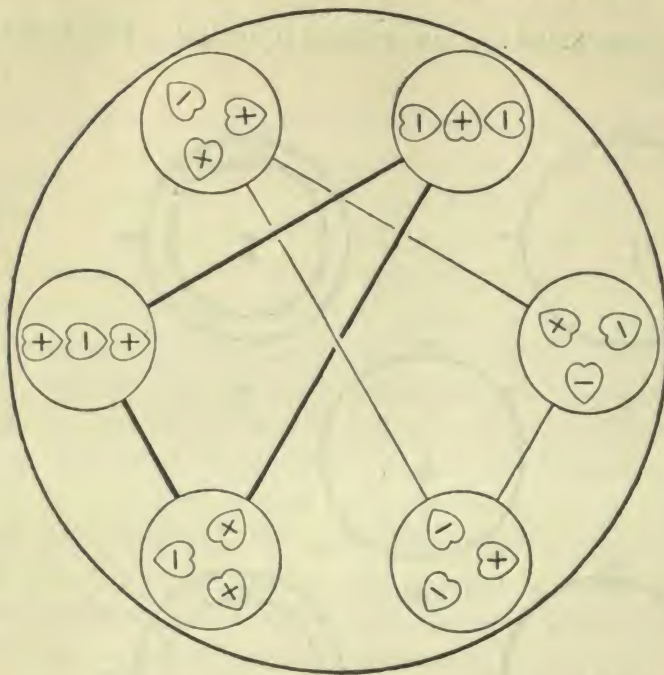
H - A HYDROGEN ATOM (NEUTRAL)

4 - A HELIUM ATOM

DIAGRAM 5

Occult investigators too have described different varieties of hydrogen, ordinary hydrogen which is neutral and a positively charged hydrogen. The structures of the hydrogen as given by them (see diagram 6) indicate the *possibility* of a negatively charged hydrogen also and

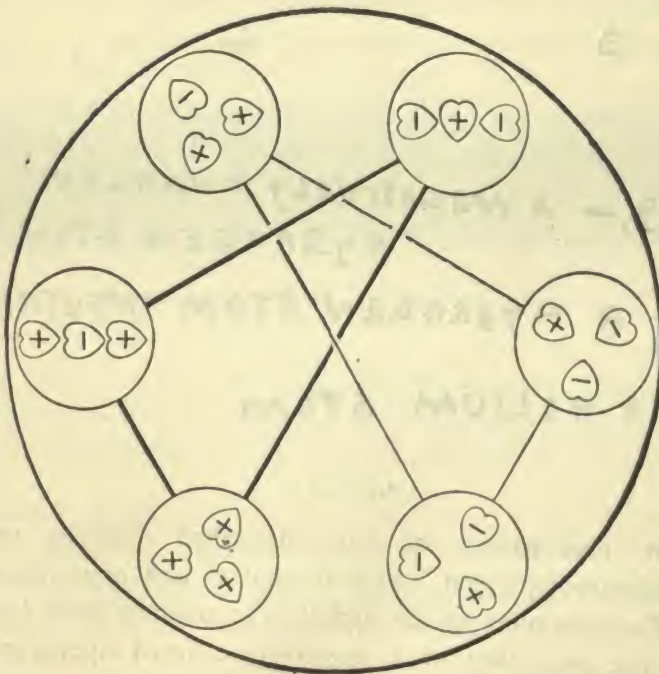
Hydrogen—Variety 3



B
9 (+)
9 (-)

DIAGRAM 6

Hydrogen—Variety 3

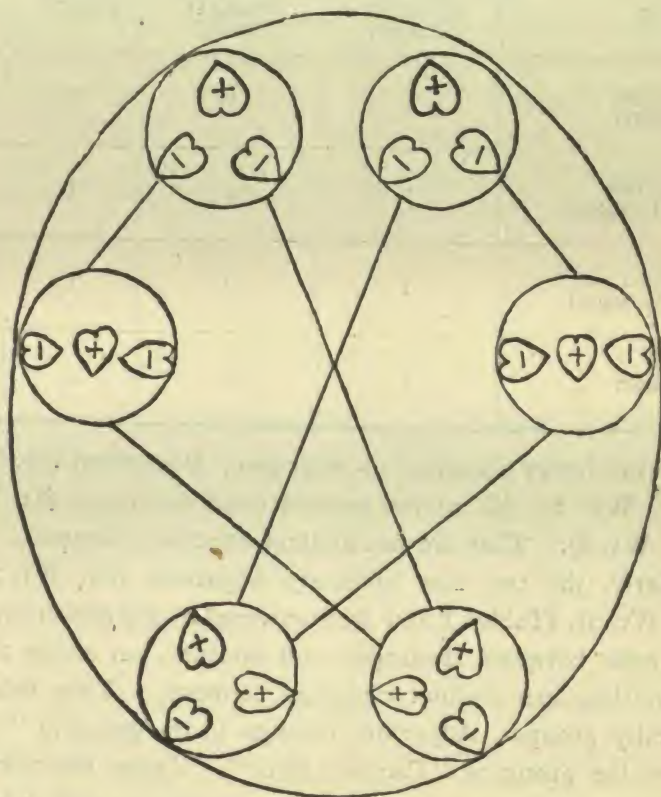


third Variety
10 (-)
8 (+)

A
10 (+)
8 (-)

perhaps of more varieties of hydrogen, but they may be unstable and so do not exist, or some of them may be existing and not yet detected. The following is a description of the structure of hydrogen as given by the occult investigators from investigations carried out as early as 1825 :

"Hydrogen (*Vide* Diagram 6) consists of 'six small bodies contained in an egg-like form. . . . The Six little bodies are arranged in two sets of three, forming two triangles that are not interchangeable, but are related to each other as object and image . . . Further, the six bodies are not all alike ; they contain each three smaller bodies—each of these being an ultimate physical atom—but in two of them the three atoms are arranged in a line, while in the remaining four they are arranged in a triangle ' " ' "



10 (-)
8 (+)

DIAGRAM 7

A Third Variety of Hydrogen Negatively Charged

¹ Quoted from an article by C. Jinarājadāsa, O.C., p. 749, T., March 1924.

A hydrogen atom contains 18 Anu. (An Anu is an Ultimate Physical Atom; the same word is used for plural also.)

Ordinary hydrogen contains 9 (+) Anu and 9 (—) Anu. (neutral)

A second Variety contains 10 (+) Anu and 8 (—) Anu. (positive)

A third Variety contains 10 (—) Anu and 8 (+) Anu. (negative)

Could this third variety of hydrogen have any relationship with the negatively charged hydrogen discovered by Chadrasekhara in the solar atmosphere?

DEUTERIUM, TRITIUM (ISOTOPES OF HYDROGEN), ADYARIUM AND OCCULTUM

NAME	AT. NO. (NUCLEAR CHARGE)	AT. WT. (NUCLEAR MASS)	PROTON	NEUTRON
Hydrogen (ordinary)	1	1	1	0
Deuterium (Heavy Hydrogen)	1	2	1	1
Tritium (Heavy Hydrogen)	1	3	1	2
Helium	2	4	2	2

The two heavy isotopes of hydrogen, Deuterium (At. Wt. 2) and Tritium (At. Wt. 3), fill up the gaps between Hydrogen (At. Wt. 1) and Helium (At. Wt. 4). They are not distinct chemical elements.

Similarly, the two new elements Adyarium (At. Wt. 2) and Occultum (At. Wt. 3), (Tables 1 and 3), discovered by the occult investigators, fill up the gaps between Hydrogen and Helium, but unlike the isotopes of hydrogen, they are distinct chemical elements. They belong to two different family groups. Adyarium belongs to the group of "Stars" and Occultum to the group of "Crossed Bars". Under the circumstances, the two isotopes, Deuterium and Tritium, cannot be said to be scientific corroborations respectively of Adyarium and Occultum.

ATOMIC NUMBERS

Now there are no gaps between the atomic numbers 1 and 2 of hydrogen and helium respectively. (See Table 3). The isotopes have no

separate atomic numbers. What Atomic numbers are to be given to Adyarium and Occultum which are distinct chemical elements according to the occult investigators? Similarly, what atomic numbers are to be given to X-, Y-, Z-, interperiodics, "Kalon" and "Meta-Kalon" and Canadium? (*vide supra*) Table 3. This matter requires to be investigated. This question may perhaps lead to a reconsideration of Mosley's Law of Atomic Numbers.

INTEGRATION

The great need of the present day is knowledge of each other's viewpoints, appreciation by one of what the other is doing, open-mindedness, co-operation and collaboration, a synthetic outlook and an integration. We should not forget that nature is one organic whole and to know and understand her fully, a spirit of friendliness between workers of different schools of thought is very necessary and should be cultivated. There is nothing to lose but everything to gain in this co-operative effort. Above all, what is needed is not only knowledge but wisdom to make a good use of one's knowledge.

TABLE 3

From *The Theosophist*, Vol. LIV, July, 1933, pp. 473-475

TABLE OF ATOMIC WEIGHTS

As recorded by Clairvoyant Investigations

SERIAL NUMBER	NAME	SYMBOL	NUMBER OF " ANU "	WEIGHT H=1	WEIGHT ¹ O=16	ATOMIC NUMBER	
1	Hydrogen	...	H	18	1	1.008	1
2	"Adyarium"	...	"Ad"	36	2		2
3	"Occultum"	...	"Oc"	54	3		3
4	Helium	...	He	72	4	4.003	2
5	Lithium	...	Li	127	7.055	6.940	3
6	Beryllium	...	Be	164	9.11	9.02	4
7	Boron	...	B	200	11.11	10.82	5
8	Carbon	...	C	216	12	12.010	6
9	Nitrogen	...	N	261	14.50	14.008	7
10	Oxygen	...	O	290	16.11	16.000	8
11	Fluorine	...	F	340	18.88	19.00	9
12	Neon	...	Ne	360	20	20.183	10 ¹
	"Meta-Neon"	...	—	402	22.33		
13	Sodium	...	Na	418	23.22	22.997	11
14	Magnesium	...	Mg	432	24	24.32	12
15	Aluminium	...	Al	486	27	26.97	13
16	Silicon	...	Si	520	28.88	28.06	14
17	Phosphorus	...	P	558	31	30.98	15
18	Sulphur	...	S	576	32	32.06	16
19	Chlorine	...	Cl	639	35.50	35.457	17
	"Proto-Argon"	...	—	672	37.33		2
20	Argon	...	A	714	39.66	39.944	18
21	Potassium	...	K	701	38.944	39.096	19
22	Calcium	...	Ca	720	40	40.07	20
	"Meta-Argon"	...	—	756	42		
23	Scandium	...	Sc	792	44	45.10	21
24	Titanium	...	Ti	864	48	48.1	22
25	Vanadium	...	V	918	51	50.98	23
26	Chromium	...	Cr	936	52	52.01	24
27	Manganese	...	Mn	992	55.11	54.93	25
28	Iron	...	Fe	1008	56	55.85	26
29	Cobalt	...	Co	1036	57.55	58.94	27
30	Nickel	...	Ni	1064	59.11	58.69	28
31	Copper	...	Cu	1139	63.277	63.57	29
32	Zinc	...	Zn	1170	65	65.38	30
33	Gallium	...	Ga	1260	70	69.72	31

¹ International Atomic Weights, 1941.² Referred to in the Note (*Vide supra*).

SERIAL NUMBER	NAME	SYMBOL	NUMBER OF " ANU "	WEIGHT H=1	WEIGHT O=16	ATOMIC NUMBER
34	Germanium	Ge	1300	72.22	72.60	32
35	Arsenic	As	1350	75	74.91	33
36	Selenium	Se	1422	79	78.96	34
37	Bromine	Br	1439	79.944	79.916	35
38	Krypton	Kr	1464	81.33	83.7	36
	" Meta-Krypton "	—	1506	83.66		
39	Rubidium	Rb	1530	85	85.48	37
40	Strontium	Sr	1568	87.11	87.63	38
41	Yttrium	Yt	1606	89.22	88.92	39
42	Zirconium	Zr	1624	90.22	91.22	40
43	Columbium (Niobium)	Cb (Nb)	1719	95.50	92.91	41
44	Molybdenum	Mo	1746	97	95.95	42
45	¹ Masurium (Technetium)	Ma (Te)	1802	100.11		43 ¹
46	Ruthenium	Ru	1848	102.66	101.7	44
47	Rhodium	Rh	1876	104.22	102.91	45
48	Palladium	Pd	1904	105.77	106.7	46
49	Silver	Ag	1945	108.055	107.880	47
50	Cadmium	Cd	2016	112	112.41	48
51	Indium	In	2052	114	114.76	49
52	Tin	Sn	2124	118	118.70	50
53	Antimony	Sb	2169	120.50	121.76	51
54	Tellurium	Te	2223	123.50	127.61	52
55	Iodine	I	2287	127.055	126.92	53
56	Xenon	Xe	2298	127.66	131.3	54
	" Meta-Xenon "	—	2340	130		
57	Caesium	Cs	2376	132	132.91	55
58	Barium	Ba	2455	136.388	137.36	56
59	Lanthanum	La	2482	137.88	138.92	57
60	Cerium	Ce	2511	139.50	140.13	58
61	Praseodymium	Pr	2527	140.388	140.92	59
62	Neodymium	Nd	2575	143	144.27	60
63	² Illinium	Il	2640	146.66		61
64	X Interperiodic	—	2646	147		} 1 1 1
65	Y Interperiodic	—	2674	148.55		
66	Z Interperiodic	—	2702	150.11		
67	? Samarium	Sm	2794	155.22	150.43	62
68	? Europium	Eu	2843	157.944	152.0	63
69	? Gadolinium	Gd	2880	160	156.9	64
70	? Terbium	Tb	2916	162	159.2	65
71	? Dysprosium	Dy	2979	165.55	162.46	66
72	? Holmium	Ho	3004	166.88	164.94	67
73	? Erbium	Er	3029	168.277	167.2	68
74	" Kalon "	"Ka"	3054	169.66		} 1
	" Melta-Kalon "	—	3096	172		
75	? Thulium	Tm	3096	172	169.4	69
76	? Ytterbium	Yb	3131	173.944	173.04	70

¹ Referred to in the Note (*Vide supra*).² *Nature*, Vol. 159, p. 24 ; pp. 8-10 ; p. 24, 4-1-47.

SERIAL NUMBER	NAME	SYMBOL	NUMBER OF " ANU "	WEIGHT H=1	WEIGHT =16	ATOMIC NUMBER	
77	' ? Lutecium	...	Lu	3171	176.166	174.99	71
78	Hafnium	...	Hf	3211	178.388	178.6	72
79	Tantalum	...	Ta	3279	182.166	180.88	73
80	Tungsten	...	W	3299	183.277	183.92	74
81	Rhenium	...	Re	3368	187.11	186.92	75 ¹
82	Osmium	...	Os	3430	190.55	190.2	76
83	Iridium	...	Ir	3458	192.11	193.1	77
84	Platinum	...	Pt	3486	193.66	195.23	78
85	" Canadium "	...	—	3514	195.22		79 ¹
86	Gold	...	Au	3546	197	197.2	
87	Mercury	...	Hg	3576	198.66	200.61	80
88	Thallium	...	Tl	3678	204.33	204.39	81
89	Lead	...	Pb	3727	207.055	207.21	82
90	Bismuth	...	Bi	3753	208.50	209.00	83
91	Polonium	...	Po	3789	210.50		84
92	" 85 " Astatine ¹	...	At	3978	221		85 ²
93	Radon (Niton)	...	Rn	3990	221.66	222	86
94	" 87 " Francium ¹	...	Fr	4006	222.55		87 ²
	" Meta-Radon " (Niton)	...	—	4032	224		
95	Radium	...	Ra	4087	227.055	226.05	88
96	Actinium	...	Ac	4140	230		89 ³
97	Thorium	...	Th	4187	232.611	232.12	90
98	" 91 " }	...	—	4227	234.833	231 ²	91 ³
99	Uranium	...	U	4267	237.055	238.07	92
	² Neptunium	...	Np		239		93
	² Plutonium	...	Pu		238 (239)		94
	³ Americium	...	Am		...		95
	² Curium	...	Cm		...		96

¹ *Nature*, Vol. 159, p. 24; pp. 8-10; p. 24, 4-1-47.² Referred to in the Note (*Vide supra*).³ See p. 335.

EVOLUTIONARY BIOLOGY

THE EVOLUTION OF FORM

BY MARGARET A. ANDERSON

Occultism teaches that no form can be given to anything, either by Nature or by man, whose ideal type does not already exist on the subjective plane . . . *our* human forms have existed in the Eternity as astral or ethereal prototypes . . . these supersensuous moulds *contained, besides their own, the elements of all the past vegetable and future animal forms of this Globe.* Therefore, man's *outward* shell passed through every vegetable and animal body, before it assumed the human shape.¹

MODERN views of evolution differ from the early Darwinism born of a more materialistic age. Theosophy, again, has its own contributions to offer, and can throw light on more than one obscure problem. According to *The Secret Doctrine*, man came first as well as last—a paradox which needs explanation. Occult science regards man as "a state of consciousness", existing ideally in the Thought of the Eternal. He is therefore not "an offspring of the brute", but the Archetype outside of physical matter and only recently apparent in human guise. As the Archetype he contained all the potentialities which emerged in the mineral, vegetable and animal kingdoms first at mental and astral levels. (See Appendix.)

The evolutionary scheme is on a grandiose scale. In connection with our Earth it postulates seven great cycles, or "Rounds": broadly speaking, they may be identified with geological Eras. The earliest forms of "man" in the first Round (Eozoic and Archeozoic Eras) were etheric, that is, of "the most tenuous matter compatible with objectivity". The cloudy amœboid forms (of amœba-like immortality) were in direct association with the mineral kingdom, and quite impervious to the tremendous heat

¹ S. D., I, 303.

of the earliest period. At this stage "man" multiplied by fission. During the next Round (Proterozoic Era) his bodies became "ectoplasmic" and reproduction was through budding, or gemmation.

Science is faced with the the great problem of how to account for the origin of organic life, which first appears to have arisen in the Archeozoic Era. Theosophy can here offer a reasonable hypothesis to account for the first transmission of those intangible germs of life which brought about the momentous "jump" from the inorganic to the organic. The ethereal forms of man, the Progenitors, periodically broadcast fragments of their own life-essence. It is quite likely that etheric atoms cast off by "man" in the Archeozoic Era (first Round) gave rise to a bacterial form of life, akin to the bacteriophage¹ discovered by d'Herelle. Falling into the warm primeval waters of the Proterozoic Era, at a time when radiation and the atmospheric and chemical conditions were exactly suitable, blebs of ectoplasmic (or protoploid) substance cast off by the second Round "man" may well have formed the first true protoplasm. The bread of life cast upon the waters returned again as unicellular organisms. Theosophy can offer this solution for the mystery of the origin of organic life upon earth, when the great "jump" was taken. It is probable that the subtle bodies of man at his etheric rehearsal stage threw off vital substances in many quarters of the globe simultaneously. It is important to note that the primitive organisms proceeded to develop very swiftly in comparison to ethereal man, who did not descend into objectivity until the fourth Round. During the later pre-Cambrian period (second Round), "man" occupied "vegetable forms". During the following Round, reproduction passed from the budding to the oviparous stage—a stage which covers the Palæozoic and the Mesozoic Eras, i.e., from about 600 million to 50 million years ago "man" occupied reptilian and ape-like forms; the latter were the prototype of the anthropoids, but not being fully densified these did not leave fossil traces.

The true age of Man came into being in the fourth Round, early in the Cainozoic Era, (Diagram 1), with the first of the seven races of Mankind. *The Secret Doctrine* avers that the earlier races *recapitulated* the stages passed through by ethereal man in early Rounds. Etheric particles and moist ectoplasmic (or protoploid) exudations were thus thrown off, became absorbed by plants and animals and greatly stimulated

¹ Ultra-microscopic bacteria.

ERAS	PERIODS	ANIMAL RANGES TABLE									
(Tertiary) Cainozoic	Recent										
	Pleistocene										
	Pliocene										
	Miocene										
	Eocene										
	Paleocene										
Meso- zoic	Cretaceous										
	Jurassic										
	Triassic										
Newer Palaeo- zoic	Permian										
	Carboniferous										
	Devonian										
Older Palaeo- zoic	Silurian										
	Ordovician										
	Cambrian										
Arch- eozoic	Torridonian										
	Charnian										
	Uriconian										
Eozoic	Dalradian										
	Etc.										
Azoic											

DIAGRAM I¹

their evolution. Becoming increasingly densified, a quite recognizable human being of the gorilla-type appeared in the third Lemurian Root-Race during the Miocene period. Occultism takes the view that the anthropoid ape is the result of cross-breeding between primitive man and primitive mammal—a view with which scientists concur. Science affirms that our ancestors sprang from a stem common to the ancestry of the

Anthropoid ape The
result of Cross-
Breeding

¹ Adapted from *Evolution in the Light of Modern Knowledge* (a collective work).

gorilla stock. Specialization of structure and function produced the various types. (See Appendix.)

The fourth Root-Race produced the civilization of Atlantis; the Chinese came from its sub-races. The Root-Races, each of which contains seven sub-divisions, naturally overlap. The fifth sub-race of the fifth Root-Race is now dominant in the world. Its sixth sub-race is said to be emerging in Australasia and North America; out of it will arise the sixth Root-Race some hundreds of years hence.

With the final advent of the seventh Root-Race in the far distant future, humanity will have reached its evolutionary goal for the fourth Round.

Having given a bird's eye view of the theosophical approach to the Science of Life as a whole, let us turn to the evolution of the form side. It will have been noted that occult science takes into account the inner side of evolution, where the pattern of things below is laid down, so to speak. There is constant interplay between these two sides of evolution. Thus, as Professor Emile Marcault has observed, the outer forms of the plants we see are their individual bodies: we cannot see their true being which is the *species itself*; that species exists as a unity on the astral plane and is not objective to us.

The theosophical notion, towards which many signs indicate that scientific philosophy is tending, is that life manifests at successive levels, being ever a unity at the level from which it manifests, but breaking up into duality below, that on the plane of its manifestation, there giving rise to the pair: organism—environment. . . .

. . . . At the next level, that of the vegetable kingdom, we find *life's unity on the astral plane*, its duality on the etheric sub-planes, being the etheric environment from which it derives and directly assimilates vitality (that of the sun).¹

. . . . The characters which constitute the species, by which one species is distinguished from another species, express themselves in all its members alike; and they are expressed in terms of organism. . . .

. . . . To find the true phenomenon of evolution below the level of man, we have to seek among species, not between *individuals*. For evolution is

¹ Quarterly Bulletin of the Theosophical World University, 1931, No. 2, "*Environment: Human and Non-human*".

of the life, and the structure of life which comprises as *subjective zone the whole group life*, and as *objective zone the collectivity of its members*, belongs to the species as a whole. One character modifies all the members alike in the only structure *they individually possess*—that of the organism.¹

The simplest Protozoa (which appear to have arisen in the Archeozoic Era) are but the topmost twigs of the tree of life. Each cell is dominated by its central point, the *nucleus*, (Latin, a kernel), and this is the seat of life, *Nucleus, the Seat of Life*. It is connected with growth, reproduction and nutrition. It secretes the ferments, or enzymes—organic, colloidal catalysts—without which nutrition cannot take place. It may be inferred that *Protoplasm* these impalpable vital substances emanated from the same primal source as the first cell: that is to say, from ethereal "man", the Progenitors, who cast the bread of life upon the waters in the beginning. Etheric matter and ectoplasmic exudations may be thought of as the substratum, or matrix, for protoplasm itself, which science calls the basis of life. *Active protoplasm* contains innumerable particles and droplets and about 70 per cent of water; the ultra-microscope revealed it to be a colloidal system, now known to carry electric charges.

The chromosomes within the nucleus are the essential vehicle for inheritance. Cell-division may be direct or indirect, the *Chromosomes* nucleus dividing first. In mitosis, or indirect division, a symmetrical spindle is formed which unites the two asters. Each chromosome divides lengthwise, sending one-half to each pole; then the nucleus divides across its equator. The nucleus has been described as the central nervous system of the cell, though for all we know the centrosome (in the aster) may be the most important part; it may well be the source or seat of motion. Professor Macbride speaks of the chromosomes, within which lie the genes, as "organized living beings". There is a variety of reasons for holding that "they retain their individuality throughout all the phases of the nucleus". Indeed, biological research has proved that the essential structure of the chromosomes remains unaltered and that they are actually present *in all the cells of the body*.

This is most significant. It may be the needed clue, a veritable Ariadne's thread, which may enable occultists to understand how the karmic "skandhas" express themselves through the laws of Heredity via the etheric double.

¹ *Ibid.*, 1930, No. 3, "The Psychological Basis of Individual Education".

When unicellular organisms became two-celled, the first step was taken towards cell-colonies and complex organs and bodies. Complexity soon increased in the first Metazoa, which possess at least two sorts of cells arranged in masses, or "tissues", in which the cells co-operate functionally. The egg starts as a rounded cell and converts itself into a ball of cells called the "blastula". One side of this ball becomes indented, *i.e.*, "invaginates", and is converted into a two-walled cup called the "gastrula". The outer layer, or ectoderm, gives rise to the skin; the inner lining is the endoderm which produces the lining of the alimentary canal and its outgrowths. With the later mesoderm, or middle layer, we have the three germinal layers from which all living organisms are built up.

As a general law, it may be said that inherited structure is the "crystallization" of the *habits* of past generations. All land animals in the beginning of their evolution show five fingers or toes on each foot. Here is a sign-manual of man's relationship to the evolving forms below him plainly inscribed on the evolutionary scroll. Very early in their history newts and frogs lost the thumb; the lizards have retained it. (Lemurs and monkeys have an opposable thumb). The American fossils show all the stages in the horse, from five toes up to the present stage of the middle toe with a slender splint of bone on each side.

Simple forms of aquatic plants show a phase where detached cells are freely mobile in water; the same thing is seen in the life-cycle of all the simpler land plants. Mosses, liver-worts, ferns, club-mosses and horse-tails depend at one critical point upon external fluid (water) as a medium for that mobility. The encysted state, with cell-walls surrounding stationary protoplasts, was a later development in plants. In fact, it is observed:

The flora of the land is not primary, but secondary. Its constituents have adapted themselves to the atmospheric surroundings which they adopted—the greatest of migrations in an age long past, *viz.*, the transition of plant life from Water to the Land.

In the simplest organisms, vegetable or animal, sex begins by the union of two germs to form a zygote. The importance of the function seems to lie in the union of two different nuclei containing different potentialities of life and growth. In plants the zygote gives rise to a new plant, after dividing (either directly or indirectly)

to form zoöspores, each of which can grow into a plant. The zoöspores are motile cells, equipped with fine protoplasmic threads, the cilia, or flagella. Gray proved that their vibration is caused by alternate contractions of the two sides of the flagellum.

There is nothing more fascinating than trying to trace the first beginning of new forms in the story depicted in evolution. The earliest plant-remains occur in the Devonian rocks, though plant-life existed before that period. The primitive fungi are believed to be originally derived from *colourless* flagellates, related to the coloured forms which gave rise to algae.

Beginning of
New Forms

The sponges (Porifera) represent a successful experiment in colonial expansion along a side-line which did not go very far. They do not possess mouths, sense-organs or nerves. Certain cells make a current with actively-beating flagella; this current passes through its aggregated or multicellular body, and so brings it food.

Sponges

The minute stinging animals, the Coelentera, show the first true mouth and food-canal, and also the first special sense-organs. They point the way to the simpler worms, the Planarians or Turbellarians. Comb-bearing Coelentera have an incipient mesoderm, or mid-layer of cells.

Worms show the beginning of bi-lateral symmetry and head—brains and body cavity. They also show the *establishment* of the important mesoderm, which in higher animals was going to provide muscles, circulatory systems, kidneys and skeleton. The mesoderm backbone was to finally replace the notochord.

With the Nematodes (thread-worms) began a through-and-through, open food-canal. In the aquatic ribbon-worms (Nemertea) blood first appears; some of them have hæmoglobin. They had the first "closed" blood-system. Earth-worms are most remarkable creatures and well repay study. In their phyla were developed sensory nerves, able to respond to vibrations of heat, light and chemicals. Earth-worms began the habit of moving head-foremost. A few (such as *Alma* and *Dero*) have minute gills on the side of the front end of the body, indicating that they have sprung from aquatic stock. Burrows of worms are found in pre-Cambrian rocks.

Earth-Worms

Sea-worms, unlike earth-worms, have "indirect" development, *i.e.*, free-swimming larvæ are hatched out which do not resemble their parents. In one sea-worm called the sea-mouse, and also in the leech, "chromaffin cells" occur which are

Sea-Worms

similar to those that secrete the adrenal hormones in vertebrates. Dr. J. A. Thompson concludes:

It is not unlikely that ancestral worms in that wide sense gave rise, not only to their successors today, but to echinoderms, molluscs, bryozoa, brachiopods, arthropods, and even vertebrates.

The lancelet (*Amphioxus*) is an invaluable link in the evolutionary chain. Its name is derived from *amphi*, both, and *oxus*, sharp, because it is without a head, and is equally pointed at both ends. It easily burrows in the sandy bottom of the sea. In this limbless and simplest of all primitive vertebrates the backbone is foreshadowed by a "notochord"—a simple cellular rod which runs from one tip to the other. It has small dorsal cartilaginous rods which suggest the commencement of vertebral spines. The spinal cord which lies above the rudimentary backbone, contains a slight swelling at the anterior end of the creature. This faintly suggests an incipient brain; within it is a pigmented spot which may be the beginning of an eye.

The lampreys, a genus of round mouths, seem to represent an ancient race even more primitive than the earliest fishes. They did not leave traces in the fossil record because their skeletons were too gristly. But certain structures called "conodonts" in very early strata have been identified by some scientists as the teeth of lampreys. It is interesting to note that vertebrates of the lamprey genus have pineal development resembling an eye.

The earliest fishes, equipped with "skin-teeth" and eyes, first appear in the fossil records during the Silurian period of the Palæozoic Era about 500 million years ago. These were the cartilaginous Elasmobranchs, which still persist. Among their descendants is a Japanese shark, the *Chlamydoselachus*, probably the oldest living type in the world, whose direct ancestors go back to the Devonian period. The Elasmobranchs were followed by the Ganoids, with large hard scales, bones in their skulls, and pectoral girdles. They had their "golden age" in the Carboniferous Period. The Ganoids were the ancestors of the interesting Dipnoi—a small transitional order of the Permian period. The Dipnoi had an undivided notochord; in them the swim-bladder, or air-bladder, first became able to function as a true single or double lung. This new development provided the bridge to the race of amphibians. The present type of fishes also sprang from the Ganoids.

Fishes having led on to amphibia, reptiles were able to come into being; with them began the "higher vertebrates".

Reptiles

Their earliest remains are in Permian strata: Ichthyosaurs, Dinosaurs and Plesiosaurs. The latter (from Greek *plesios*, near to, and *sauros*, lizard) was the leading genus among the fossil sea-reptiles of the Mesozoic Era.

Huxley was the first to see the close structural affinities between reptiles and birds. The fossil remains of *Archæopteryx* show that it was an intermediate link between reptiles and birds. The jaws possess teeth; the tail is long and jointed like that of a lizard, but possesses feathers; the "fingers" instead of being fused together are quite movable, with claws at their ends. It had feathered wings to fly with.

A unique lizard exists in New Zealand, of the *Sphenodon* genus, in which the "third eye" is found. It corresponds to the pineal gland of the vertebrate. In the case of lizards it grows outwards through the skull to form a median eye.

A four-chambered heart occurs for the first time in crocodilians.

An important new type of fossil has recently been discovered in South Africa, which may be a valuable evolutionary link. It is believed to be between 170 million and 180 million years old. According to a report in *The Times* (26 July 1936), it is said to be shaped like a tortoise, has large tusks, and probably had a hard scaly skin like the early fish. Dr. Broom, of South Africa, thinks it may be an entirely new species of a group of mammals.

The duck-billed mole, or *Platypus* (*Oxyrhynchus paradoxus*), is indeed a living paradox. Aquatic in habit, it is found in Australian swamps, or living on the banks of rivers.

An Evolutionary
Enigma

This creature, two feet and six inches in length, is itself a "living fossil" (no fossils are known). As an evolutionary enigma it is unique, as the following details will show. Although it has no close connection with birds the duck-billed mole has webbed feet; the heart in its structure is like that of birds; the bones of the skull fuse and are polished, as in the case of the birds. The duck-billed mole is oviparous, like its neighbour the Spiny Ant-eater. The eggs have yolks within horny shells, and the development is essentially similar to that of hens, though they undergo segmentation as in reptiles. Development proceeds within the eggs before they are laid through nourishment absorbed from the

mother. Its "duckbill" is due to an expansion of the mandibles and is covered with a soft horny sheath. The breast-bone is like that of lizards and some other reptiles. This duck-billed mole has soft, thick, dark-brown fur, and it suckles its young with milk exuded from the pores of the skin. The Platypus is getting rather rare. It represents the lowest extant stage of mammalian evolution.

The Mesozoic Era has been called the "Age of Reptiles". Many strange-looking giant forms sprang on to the stage of life only to die out. The crest of the "Age of Mammals" surged up during the Cainozoic Era. Again, a host of

The "Age of Reptiles" gigantic forms appeared with what has been called "dramatic suddenness". A hornless rhinoceros in Asia was of such monstrous size that a tall giraffe would only just have been able to top its shoulder.

In Africa the Okapi, relative of the giraffe, represents an archaic type. Like other ungulates, or hoofed animals, it developed from the extinct Phenacodus.

Palæontology, through the enormously long geological records, affords us many proofs of the truth of the evolution of form. One example from American fossils will suffice.

The Evolution of the Horse The evolution of the horse can be pieced together, bit by bit. The picture begins in early Eocene rocks with creatures only twelve or thirteen inches high, possessing five toes, the middle one being a little larger than the rest. Changes can be followed as they proceeded down the ages, until in the Pliocene period the hind-foot became composed of a slender splint of bone on each side of the big middle toe—the true horse had appeared on the scene.

The Lemur genus, standing at the base of the order of Primates, includes the half-ape Spectral Tarsier—a shy, gentle little creature, frequenting the forests, and of nocturnal habit. It is of special interest to anthropologists. The Tarsier is found in Malaya. Lemurs, like monkeys, have an opposable thumb. The most significant feature in the Tarsier was its eyes. (Hence its name of "Spectral Tarsier".) For the first time the eyes had come so close together that they could focus on one spot. This condition led to improvement in brain capacity and opened the way to other kinds of development.

It is well to bear in mind the fact that although Palæontology—the record of the rocks—teaches us a great deal, it does not seem to touch the

origin of the animal phyla. "The strata in which those archives were deposited have been crushed and burnt and recrystallized out of all recognition, and their secret is lost perhaps for ever, one cannot even guess at the nature of it". Under such circumstances we have unearthed a surprising amount of knowledge.

There are certain considerations arising out of the story of the rocks which deserve attention. Leading palæontologists, such as Professor H. F. Osborn in America, say that biologists have not had time to trace species or adaptive characters from beginning to end. One has to remember that it takes an exceedingly long period for changes to arise and establish themselves; that, moreover, the records show that what is going

to appear ages afterwards arises in the very beginning in the place where it will afterwards be significant. It grows larger either steadily, or by jumps, just as if it were growing towards an inevitable purpose. Such variations are described as "orthogenetic" or "determinative". They have led Osborn to say that they seem to indicate "some quite unknown intrinsic law of life". (They may lead theosophists to think of the Archetypal World, or the Mind of the Logos.)

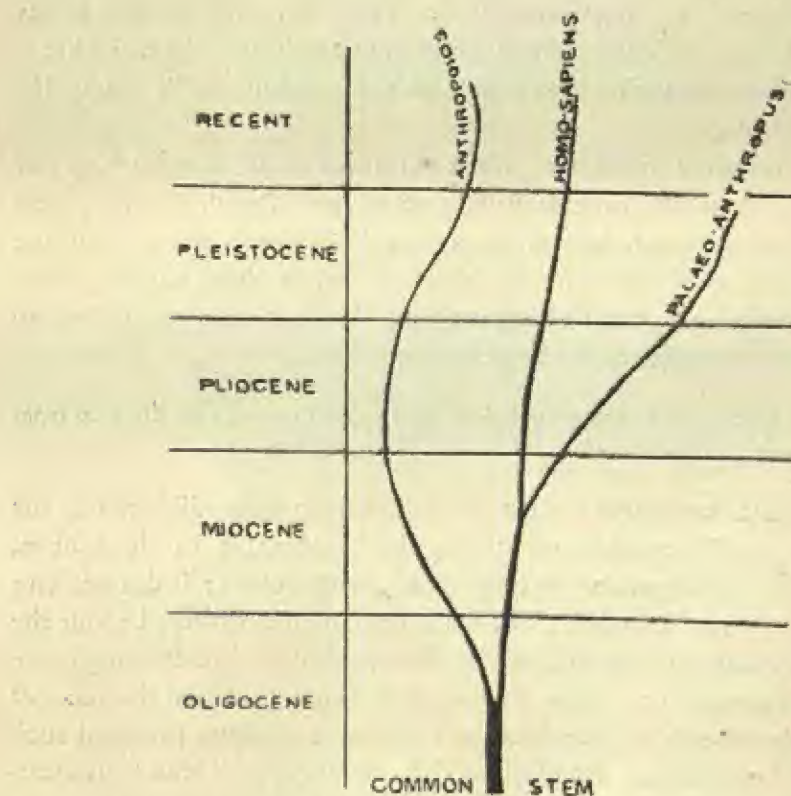
Man, according to science, struck out a line of his own between one million or two million years ago. Occult science places it much farther back (see "Anthropology"). All the Primates, at the final development of which stands *Homo sapiens*, came from some *Tarsius*, or a Lemur-like creature. Nevertheless, science has to acknowledge the inadequacy of the present position.

We have not much idea what forms man passed through on his way from Tarsier or Lemur to *Homo sapiens*.

The main anthropoid stem is believed to have diverged in the Oligocene period; this line eventuated in the gibbon, chimpanzee, orang-outang and gorilla; it did not give rise to man. The main human stem diverged about the same time according to the findings of anthropologists, sub-dividing again during the Miocene, the main human line going to form the races of mankind with whom we are familiar; the other branch provided such species as Neanderthal, Rhodesian and Heidelberg "Man" (Palæo-anthropus), whose remains belong to the million years of the Pleistocene period. (See diagram 2.)

A glance down the vistas of history may help us to see how the present stage of biological knowledge has been reached. Ecology Botany and Zoology are two of the main pillars upon which the structure of Biology has risen to its present height. Ecology, founded upon direct observation of animals' behaviour in their own habitat, has taken on the dimensions of a new science (especially in Germany).

Any historical survey has much to gain from racial psychology. It shows how a sequence of phases of consciousness, ranging from the first perception and sensation, through respective stages of activity, emotion, analytical and synthetic mind, intuition and the will, can outline a universal plan. There are individual as well as national and racial cycles of periodicity, cycle being superimposed upon cycle. This synthetic approach to history is itself due to a "Synthetic Mind period".



· DIAGRAM 2

The Origin of
Science

One usually hears it said that science (including biology) is derived from ancient Greece; but the real origin goes very much farther back than that, judging from recent discoveries. Edwin Smith discovered a papyrus which proves that biology was being studied in ancient Egypt. The papyrus in question is a fragment of a surgical treatise; it shows accurate anatomical knowledge and some understanding of physiology too. "It is a work of science in the modern sense", says Professor Benjamin Farrington, "and bears in itself the proof that its teaching is not new. Technical terms are interpreted for the reader. It is therefore presumably a manual dealing with a traditional branch of knowledge which may quite possibly be as old as the fourth millennium B.C." The Egyptian sub-race worked through the function of Activity within a larger Mind-Cycle¹; hence it is not surprising that surgery should have been placed on a sound basis.

The Pythagoreans

In Greece, about 500 B.C., Alcmaeon, a pupil of Pythagoras, was studying Embryology. Other Pythagoreans were probably also studying along this line. Alcmaeon was a great anatomist. His chief aim was to discover "the physical basis of sense-perception". His claim to fame rests upon his description of the optic nerves and the Eustachian tubes. He arrived at the conclusion that the brain was the seat of sensation, but wrongly concluded that it was bloodless. Another famous Greek, Empedocles, did some biological theorizing, and went so far as to make a rough forecast of the Darwinian theory of Natural Selection!

Hippocrates

Hippocrates, who lived between 470 and 370 B.C., was a physician, the son of a physician and the founder of the first medical school. He was a firm believer in the healing powers of Nature. Before his time, medicine was entirely in the hands of the priests of Æsculapius, the God of Healing, and the priests had kept their knowledge secret. G. B. S. Haldane calls Hippocrates the founder, not only of scientific medicine, but of Biology also. All his teachings were based upon the behaviour of the human body in health and disease. He left behind him many treatises, including an interesting collection of his Case Histories, recording practical clinical observations.

Aristotle

Aristotle was profoundly influenced by Hippocrates. Aristotle set up a new and valuable method of classification of all living creatures, which endured until the time of Linnæus. Five hundred species of animals are mentioned in his writings.

¹ See Introduction, Part IV.

He appears to have been a "vitalist" and was really wonderfully modern in his outlook. Although he never attained to a clear view of evolution, he ascribed reason to animals. Out of his huge literary output, four works on Biology have survived. His writing had tremendous influence upon succeeding generations of the cultured and learned in Europe; they were eagerly read by men like Roger Bacon, Giordano Bruno and Nicholas da Cusa.

The brilliant intellect of these old Greeks belonged to "the Golden Age" of Greece, when the inspirational and creative power of its emotion is brought to bear upon the analytical mind-consciousness that characterizes the Mediterranean sub-race as a whole".

Biology was studied in the Alexandrian School chiefly as medicine.

The Rosicrucians

This period was followed by a long gap. In the Middle Ages, a small body of enlightened men, the Rosicrucians, studied alchemy and medicine. Among them was Paracelsus. As this was during the emotional period in Europe, (A. D. 1100 to 1600) one would not expect to see much development in the sphere of science. The ensuing "Lower Mind period" (1600 in 1800), naturally coincided with a revival of learning, and an age of discovery began.

The "Lower
Mind Period"

Thus, the first compound microscope is supposed to have been made by Jansen, a Dutchman, in 1590; Galileo improved it; it was being used in England by 1619. Too imperfect to be of much use at first, it was destined to revolutionize the science of biology. Meanwhile Leonardo da Vinci and other great painters and sculptors of that age were studying anatomy very thoroughly. Whilst in England, William Harvey discovered the circulation of the blood (without the aid of vivisection)!

In the seventeenth century the microscopists Leeuwenhoeck and Swammerdam in Holland, Malpighi in Italy, and Robert Hooke in England, were enabled to observe the detailed structure of plants, insects and animals.

During the following century, whilst a "Synthetic Mind period"

The "Synthetic
Mind Period"

was operating, lived Linnæus, the great botanist and naturalist, who held the strange view that genera, but not species, issued direct from the Godhead. He gave the world the invaluable scheme of classification which bears his name. The leading zoologist of the day, Cuvier (1769—1832), chose to oppose the evolutionary ideas of the Frenchman Lamarck, to whom we owe the adoption of the word Biology (first used by Treviranus).

Added knowledge of the great age of the earth makes Lamarck's theory more feasible. He taught that long-sustained changes in environment produced changes in the needs of animals; that change of need involves new habits; and altered function evokes changes of structure: parts more used becoming more developed—unused organs tending to disappear. He concluded that gains and losses, due to use or disuse, are *transmitted from parent to offspring*. This is a question round which controversy still continues. Lamarck laid great stress upon environment.

In 1851 Charles Darwin arrived on the scene with his first monograph. *The Origin of Species* followed in 1859. The law of evolution, so fully in harmony with theosophical teachings, could no longer be gainsaid. Although the earlier presentation has had to be modified, Natural Selection is needed to explain part of the phenomena. It is best explained in Darwin's own words:

As many more individuals of each species are born than can possibly survive: and as, consequently, there is a frequently recurring struggle for existence, it follows that any being if it vary in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be naturally selected. From the strong principle of inheritance, any selected variety will tend to propagate its new modified form.

It is worth remembering that a further step forward was taken in 1866 when Haeckel introduced the "theory of recapitulation", a theory that does not receive so much emphasis today. It was responsible, however, for a great impetus in the study of Embryology and the ancestral history of man.

An important advance came with Weismann's concept of germinal continuity, which led the way to deeper understanding of heredity. The advance was crowned by the life-work of Gregor Johann Mendel, an Austrian abbot living in retirement, who, through growing peas with mental discernment, discovered the epoch-making laws which bear his name. Prior to his death in 1884, the world took no notice, but when the papers he wrote were rediscovered a new era in biology began. According to typical Mendelian Inheritance: If in any species a cross is to be effected between true-breeding strains differing in a well-marked unit character the offspring will take after one parent only; the character that is developed is known as a

"dominant" and the one that is not developed is known as a "recessive". Mendelism is not contradictory to the abruptly-arising de Vriesian mutations; they are inherited in accordance with the laws of Mendel.

With the advent of the evolution theory we saw that genera were built up by slow unfolding; the investigations of de Vries-Mutations Vries (1901) have led to the further realization that within that sphere species can arise by sudden jumps to points of vantage. The non-variable mutations would naturally not survive. Where species are concerned, the new view is superseding that of advance by slow accumulation of minute differences. It is true that latter developments have not strictly followed the lines originally laid down by de Vries. Many new interpretations have arisen during the last thirty years. But continuous progress here has only been possible with the aid and the methods supplied by de Vries. The science of genetics has come to the fore and the biological outlook is rapidly changing; for this Mendelism and Biophysics are largely responsible. It is known that X-rays incite germinal changes; the discovery of Cosmic Radiation lends still greater interest to biological research, for the origin of species may soon be proved to be influenced by bombardment of genes by cosmic rays. The germinal factors, or genes, to which particular mutations are due, lie in longitudinal order on the chromosomes of the nuclei of the germ-cells.

Dr. Hamshaw Thomas, writing in *Nature* (1935), has described the unusual number of mutants among the flora of Costa Rica; he was inclined to ascribe this to "bursts" of cosmic radiation, which seem to be more frequent in warm, high latitudes.

A mutation which has been traced to a definite location in a known chromosome is labelled a "point mutation"; these gene-mutations have been discovered in many plants and animals, both wild and domesticated. They are acknowledged to be unquestionably due to slight germinal changes in the hereditary factors (the genes). Punnett is of opinion that "we must regard the mutation as the basis of evolution. . . . For it is the only form of variation of whose heredity we have any certain knowledge".

The "principle of Discontinuity", now so much in evidence in the realm of physics, is fundamental in the universe. When, after a million whirls round its orbit the electron flies on to another, a change probably occurs in the sub-division of the element. It is exactly the same when the gene responds to the

Mutations due to
Genes

The Principle of
Discontinuity

wave-length of a cosmic ray (as may possibly be the case): a fresh species can arise in the genus. On the inner side it will coincide with differentiation within the "group-soul" of that species.

We can see the Discontinuity principle at work around us when a child is born into a family circle. In spiritual things, initiation is just such another sudden change, an expansion on the side of consciousness. Dr. Arundale recently wrote:

Just as light is supposed to consist not in waves, but in puffs or particles, so Life consists not in ceaseless living, but in successive escapes from forms, whether of consciousness or of matter.

As it is above, so is it below. We have here one of the keys which opens a door *Where Theosophy and Science meet*.

In 1903, Professors Starling and Bayliss discovered Hormones, the so-called "chemical messengers". They are the internal secretions of the ductless glands. All the organs of the physical body are undoubtedly regulated in their growth and function by such hormones, and are therefore affected by changes in the glands. On account of this, a good many books have appeared which attempt to prove that temperament, character and behaviour are dependent on the way these glands function. For example, the suprarenal glands secrete hormones which are correlated with emotional disturbances, such as fear and anger. Facts of this nature ought to make us more tolerant of other people's idiosyncrasies!

It is interesting to note that the activities of the endocrinal glands, according to Bolk and other authorities, depend mainly on diet. (Though the hereditary factors have also to be taken into consideration). It is better to avoid alcohol, because in some subjects it affects the pituitary body, the posterior lobe of which is connected with growth of bone (*verb. sap.*). An active anterior lobe leads to increase of vigour. Science agrees with occult science that the pituitary is the "master-gland" of the whole endocrine system.

According to Bolk, again, man differs from the anthropoids chiefly because of different action on the part of the ductless glands. But there is no need to jump to materialistic conclusions. Occult science can be of real service here. It insists upon the close connection of these glands, via the sympathetic plexuses, with the force-centres (or *chakras*) in the etheric double and still more subtle vehicles of man. Occult science teaches that the splenic force-centre plays an important part in vitalizing the body

and brain. The "orange-red" ray which flows from it to the base of the spine can, by "plain living and high thinking", be deflected upwards to the brain-organs, passing along the hollow in the vertebral column. In this way a man's character and behaviour may be modified.

Occult scientists have for long asserted that the pineal and pituitary bodies are rudimentary as well as vestigial forms, and that they have been taken out of the previous mode of activity in order to serve a more useful purpose in man's higher evolution. These two organs are said to be closely connected. Dr. Besant, writing in 1904 in *A Study in Consciousness*, said that the pineal gland was connected with an astral chakra. Madame H. P. Blavatsky wrote in 1888 :

The Third Eye *is dead*, and acts no longer ; but it has left behind a witness to its existence. This witness is now the Pineal Gland.¹
And again :

The Cyclopean eye was, and still *is*, in man the organ of *spiritual* sight, . . . and having performed its function . . . was stored and laid aside by Nature for further use in æons to come.²

Theosophy declares that the next great race, (the sixth) to appear in the world, is destined to mount from the present synthetic or higher mind stage to the cosmic or intuitional level of consciousness. Humanity will then develop and use the latent powers focussed in the "third eye" in ways that the world is at present not capable of understanding. Many of our present scientific methods will become obsolete, because "direct knowledge" will be the order of the day. The distant future will provide many new keys that will open new doors where Theosophy and Science meet.

The Pineal and
Pituitary Bodies

The Intuitional
Level of Con-
sciousness

¹ S. D., II, 308.

² S. D., II, 313.

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APPENDIX

The following additional quotations from *The Secret Doctrine* are worth noting in connection with the subject-matter of this monograph (*vide infra* pp. 350-352).—ED.

1. The Kabalists say correctly that "Man becomes a stone, a plant, an animal, a man, a spirit, and finally God", thus accomplishing his cycle or circuit and returning to the point from which he had started as the *Heavenly Man*. But by "Man" the Divine Monad is meant, and not the Thinking Entity, much less his Physical Body. (S.D., II, 196.)

2. Having passed through all the Kingdoms of Nature in the previous three Rounds, his *physical* frame . . . was ready to receive the Divine Pilgrim at the first dawn of human life, *i.e.*, 18,000,000 years ago. It is only at the mid-point of the Third Root-Race that man was endowed with Manas. (S.D., II, 265-66.)

3. How is the chasm between the mind of man and animal to be bridged . . . "Primæval Man" was *man* only in external form. He was *mindless* and *soulless* at the time he begot, with a female animal monster, the forefather of a series of apes. This speculation—if speculation it be—is at least logical, and fills the chasm between the mind of man and animal. (S.D., II, 199.)

4. Occultism rejects the idea that Nature developed man from the ape, or even from an ancestor common to both ; but, on the contrary, traces some of

the most anthropoid species to the Third Race man of the early Atlantean Period. (S.D., II, 195.)

5. Materialistic Science makes man evolve gradually to what *he is now* . . . from Moneron . . . through "unknown and unknowable" types up to the ape, and thence to the human being . . . no "missing links" between man and the apes have ever yet been found. . . . Nor will they ever be met with; simply because that link which unites man with his real ancestry is searched for on the objective plane and in the material world of forms, whereas it is safely hidden from the microscope and dissecting knife *within* the animal tabernacle of man himself. (S.D., II, 199-200.)

Again, in connection with the subject-matter of this monograph, (*vide infra*, pp. 352-353), the student is recommended to read the monograph on "Anthropology" in Part III of this Series. See also the article on "Problems of Anthropology: Man's Family Tree", by E. W. Preston in *The Theosophist*, June 1938; also Diagram 6 on p. 240 of the same.—ED.

FROM MINERAL TO MAN

BY CORONA G. TREW

There is but one Science, so long as facts remain the same; what is strictly scientific is theosophical, as what is truly theosophical is entirely in harmony with all the facts, and so in the highest degree scientific.¹

Evolution according to Theosophy is that process of change whereby something that is latent and sleeping is brought into manifestation and activity. To understand this we must postulate two factors—a spirit or soul which is seeking expression, and a form or body wherein the spirit or soul expresses itself.²

HISTORY has always shown two types of men, the philosopher and the practical man, the vitalist and the materialist, the idealist and the empiricist. The natural scientist by his very technique of observation and experiment tends to belong to the latter type, whose knowledge is the outcome of direct factual experience at the physical level. The theosophical approach to nature, on the other hand, has always been from the idealistic standpoint in which the world of the spirit, unseen and often elusive and intangible, must also be included. From this point of view, no philosophy of life is valid which does not include and stress the vast field of experience of human mind and psyche. Although in the past these two viewpoints have tended to be widely divergent and often in conflict, at the present day the tendency is for them to come together and even to synthesize, so that, again and again, we find emerging a new point of view in which both idealism and empiricism, revelation and experiment, are synthesized into a new whole, a unitary experience. This "middle way" appears to be the path along which modern thought in its more progressive aspects is moving, and herein lies the hope of a more complete agreement between scientific and theosophical thought.

¹ C. Jinarājadāsa, F.P.T., p. 5.

² H. T. Edge, *The Theosophical Path*, June 1932.

Survey of the Field of Evolution In this survey of the field of evolution, from mineral through plant and animal to man, we shall endeavour to state the broad theosophical theory of the great Plan of evolution, and then see in how far modern thought may be in agreement, and upon what lines future progress and research may lie. The theory may be philosophical and idealistic, but taken with the observed facts and experiments of the empiricist, we may find the way to that synthetic experience which will give a picture satisfying both to intellect and intuition.

Life behind Forms Looking at the physical world, we see multitudes of forms, some comparatively simple, such as the chemical units of the mineral world which are the constituents of rock, sea and air; others highly organized such as the complex bodies of the human race; while in between lie almost every type and kind of form in the plant and animal worlds. Everywhere, then, there are forms, acting, reacting, changing; passing through cycles of birth, change, growth and decay. It may well seem a difficult task to attempt to fit them into a single scheme, yet it is this that the theosophical Plan of evolution attempts. It sees behind these multiple forms of the kingdoms of nature one great stream or ocean of life, the forms existing but to serve the purpose of that life. A progression from mineral to man, through plant and animal, is the process by which life or spirit, call it what one will—for it is often difficult to find a completely adequate term for this great principle—attains to self-consciousness and expression of its divine powers. These powers, latent at the beginning of the process, are manifest in their fullness at the end, an end that is yet to come. Such appears to be the goal and purpose of the scheme.

The Theosophical View of Evolution Our theosophical view of evolution in its broad outline, sees these two great interlocked and interweaving evolutionary trends, the evolution of life and of form, both parts of a single process. Forms have developed in time by increasing organization from simple to complex: chemical atom to molecule, molecule to cell, cell to organ, and organ to body. Each possesses a greater degree of complexity than the one before and with this increase becomes more sensitively balanced, often more vulnerable to the surrounding environment, but ever fitted to express more of the powers of the interior life. Life in its turn, imprisoned at first in the forms, shows a gradual release of its powers and a growing capacity to master and mould the limitations imposed on it by form. Slowly, life's potentialities

become transmuted into powers; "immetallized" and imprisoned in the mineral, it dreams in the beauty of the plant, stirs in the dawning consciousness of the animal, to awaken fully to a realization of its own divine powers in man. In broad outline this is the view of the science of Theosophy, and for our guidance we may summarize the principles involved, since they serve as a useful hypothesis in a study of the progress of life from mineral to man.

Principles
Summarized

1. Life, or spirit, exists with infinite potentialities, but in the beginning is un-self-conscious and with these potentialities unexpressed.

2. Behind all that is manifest there is the will of life to express itself in form, and it is this will, or urge, which creates the form.

3. Life, in seeking to attain self-consciousness, manifests as life-units which pass successively through the four kingdoms of nature—mineral, plant, animal and human—creating ever more organized and complex forms in each kingdom as more of the latent powers are expressed.

4. Such a process is not a continuous one in the sense that a gradually rising straight line is continuous, but is rather a cyclic process, akin to a rising spiral form. Thus life proceeds on a cyclic path, plunging recurrently down into form and then withdrawing, a process expressed in the human kingdom as rebirth, or reincarnation of the human soul in a succession of bodies, which is a special illustration of this cyclic journey. Although cyclic, the process is progressive, as the powers of life continuously unfold and need more organized forms for their expression. There are, furthermore, greater cycles. The life expresses itself through the forms of one kingdom for a period, manifesting certain qualities or faculties, and then when the cycle is completed passes on to a new one in the next kingdom where further qualities may be expressed. As successive waves of the sea break upon the shore, the kingdoms represent life-waves sweeping out into form from the ocean of life. Just as a wave, on breaking, ripples out into countless minor wavelets on the sand, so the life-units within the life-wave pass through successive incarnations in form.

A Cyclic Process

5. Each kingdom represents an advance on the ones which come before, just as a later turn of a spiral is above the early ones. Each manifests certain clearly marked qualities not shown by its predecessor and has within its forms the faculties that have been mastered in the previous ones, a point which may become clearer in viewing each kingdom in turn.

Each Kingdom an
Advance on the
Previous Ones

6. It should be noted that everywhere there is overlapping between one kingdom and the next, a common behaviour on the part of nature, recognized both by the theosophical scientist and the natural scientist alike.

Let us now consider how far such a scheme is supported by the science of today. While the empiricists still refuse to concern themselves with any scheme that is in any sense metaphysical, there have been many among the so-called vitalistic school of biologists, such as J. Arthur Thomson, Lloyd Morgan and Hans Driesch, to mention but a few who have sought to find a broad and idealistic pattern, into which to fit their experimental observations. On the more philosophic side we find great thinkers, such as Henri Bergson, General Smuts and A. N. Whitehead, enunciating philosophies in which the unseen organizing power of what we have termed life, or spirit, is recognized as the controlling factor in the evolutionary process.

Bergson in his theory of creative evolution was one of the earlier philosophers to put forward a theory in which the part played in evolution by life was recognized. In this theory all organisms or forms are seen as the unceasing creation of a life-principle, the *élan-vital*, which spontaneously manifests itself by a continual creation of new forms. General Smuts, in the philosophy of Holism, has a somewhat similar view in which any interpretation of evolution must include the whole of the organized life of the organism as well as the form, which merely subserves the uses of the organism as a changing and vital whole. Whitehead has also put forward a philosophy, from the viewpoint of the physicist, in which the whole universe is seen as a kind of dynamic organism possessing attributes of a kind similar to those found in the smaller organisms we know as plant and animal forms. He furthermore sees, and in this is supported by Eddington, that although the physical universe is apparently tending to run down to a dead and lifeless end as its temperatures become such as to kill out all the higher forms of life, this is but a partial view of the picture. It must be accompanied by some understanding that, as the evolution of life proceeds, there is an increasing growth in its independence from form until ultimately it may reach a point when it need no longer be conditioned by form. The universe may physically be running down, but it is spiritually ascending.

Passing to the biologists, Hans Driesch, working experimentally in the field of embryology, has come to similar conclusions. By experiment he has shown that it is impossible to predict the future behaviour of any animal or plant embryo from the laws of matter only, and has found it essential to conclude that some other factor, which he terms a whole-making factor or entelechy, is working behind the form and that this acts in a mind-like way, *i.e.*, according to a plan or design. He says :

And now we are becoming convinced that by starting from the parts we shall never be able to explain organic and mental life, and that there is something like design in organic nature.¹

Professor Lloyd Morgan, another biologist who spent much of his life in the study of animal life and behaviour, put forward the well-known theory of emergent evolution. Writing in *The Great Design*, he says :

Alike in the evolutionary advance of world-events since life appeared on the earth's surface, and in the development of each one of us human folk, there has been an advance of mind from sentience, with little more than awareness in living, through new products in perception towards the further novelties of the far richer life in the light of reflection.²

And finally :

What I find in evolution is *one great scheme from bottom to top, from first to last*. What I also believe is that this advance throughout nature is a revelation of Divine Agency. And since mind at its best is the highest term in the course of evolutionary ascent it may well be said that the evolution of mind reveals the agency of Mind.³

We have then, in these extracts, and many others might be cited, ample support for the first of our principles of evolution. From a survey of even more recent biological work it becomes clear that those theories of evolution which are gaining ground are the ones which are based on a concept of wholeness or organization: those which view the behaviour of individual plant and animal as an exterior expression of some interior factor controlling the life of the organism as a whole.

To sum up then the attitude of modern thought, it is probably true to say that the more advanced thinkers are prepared to accept some

¹ *The Great Design*, edited by Frances Mason, p. 286.

² *ibid.*, p. 130.

³ *ibid.*, p. 132.

scheme of creative evolution in which the universe is seen as the unfolding of a great Plan or design. Driesch expresses it:

Something spiritual, then, penetrates Nature and manifests itself in the Universe.

We may now pass on to a more detailed consideration of this journey from mineral to man, and here we enter a region where scientific thought and speculation have not been applied, namely, to a consideration of the cyclic rhythm in evolution, or what in *First Principles of Theosophy* are termed the life-waves. Although cycles and rhythms are recognized as applying in the detailed history of mankind and in the vaster geological epochs and periods which have influenced the earth, Science has not yet perceived that the kingdoms of nature themselves represent successive cycles or waves of a great evolutionary spiral. The wave that carries the more advanced types of form which constitute the human race, starting earlier in time, has already passed through its early cycles and so has reached the highest point, the present crest of the process. The animal kingdom is one cycle behind, the plant one behind that, until in the mineral kingdom of today we see another life-wave passing through an early cycle of a spiral similar to that we ourselves have traversed. Surveying all these kingdoms today we may study a process that has taken vast æons of time, and see from the qualities of each what life has gained as it traversed them each in turn. There are vast differences which separate the kingdoms, one though the whole process may be, and these differences are as stages or steps in the journey as a whole.

Returning in thought to the time before any of the forms of the physical universe were created, we can realize that the first and almost overwhelming task of the evolving life must have been to achieve a stable form. The difficulties that this involves may be realized if we envisage life in its essence; vague from the physical point of view, elusive, mobile, fluidic, ever in a state of flux and change, and yet at the same time powerful, dynamic and creative. Contrast this with the forms of the mineral world—dense, material, stable, fixed, heavy and inert—the exact antithesis of all we associate with life and we have some idea of the vastness of the initial task. How has the transformation been effected?

Matter has been defined as energy bound up in systems of balanced forces, and it is this balance that is the secret of the building of the

initial form, the atom, the unit-brick, of which the mineral kingdom is formed. The simplest mineral atom is achieved by a balance between two kinds of energy or electricity, a balance resulting in the production

Stability and
Inertia

of an apparently stable inert form. The physical atom is thus created out of the active restless energy we know as electricity. Life manifests in the mineral as energy,

which by being locked into a single point acquires stability and inertia. This quality, the capacity to endure in time and space, is the predominant characteristic of this first kingdom. In it the life-units achieve the possibility of remaining fixed in one position in space; an enormous achievement in view of their inherent nature, and of vast benefit for the later evolution of self-consciousness. The attainment of location in space,

The Beginning
of Individuality

separation from the ocean of life, represents the beginning of individuality, achieved in this first kingdom through the building of a stable unit of form. It is an achievement of as great a value to the life as the power of focus to the human vision, or of concentration to the human mind.

The initial step always proves the most difficult, and so here, the unit of a simple atom once produced, the subsequent combination of these to make, first, the gaseous atmosphere, then water and the solid minerals of the earth's surface, is as simple as the building of a house to a builder once he has learned to make his bricks. As the variety of houses depends on the variety and arrangement of the constituent bricks, so the various atoms grouped together produce the vast number of chemical compounds

Form Supreme in
the Mineral
Kingdom

of which the mineral world is formed. Life, then, in the mineral world gains form, inertia and stability, and becomes located in a comparatively single point in space; crystallized and "immetallized" it is immersed at its

deepest in matter. Form is here supreme.

The Plant
Kingdom

In the plant kingdom, a new cycle begins, and life seeks to be released from the bondage of form. The mineral unit, the atom, with its inertness and fixity, enduring for long ages of time, changes but slowly under the pressure of the vast forces of nature. The power to change and respond to the surrounding environment and, above all, to grow, is slowly added to a stable form. In this kingdom forms become more plastic, showing greater responsiveness to the interior impetus of evolving life. The rhythmic or cyclic factor becomes more apparent in the great life-cycles of birth,

growth and death. The seed unfolds and changes into plant as the life-energies flow outwards into form. A climax is reached in the perfection of the flower, and then the plant decays as life is again withdrawn, leaving another seed that the process may recur once more. It is a rhythmic alternation as life pulses in and out. Form, established in the mineral, now becomes more capable of change, more plastic and responsive both

The Birth
of a Cell

to the interior life and the pressure of the surroundings. This response and power of growth could never be achieved by the mineral unit, or atom, and so out of countless atoms in complex groups a new unit is built, the cell of the plant upon which the plant kingdom is built. This with its elaborate constitution of chemical compounds carefully balanced in their correct proportions and controlled by the central nucleus, constitutes such a plastic unit. The cell form is based on a mineral foundation, but the central controlling nucleus balances the various chemical constituents, and so builds a delicate balanced organism. Controlled by the life which streams through the nucleus, it is sensitive to the pulsing beat of the life-rhythm and to changes in external conditions. Marked changes in temperature, lack of moisture, heavy external pressures, all may kill the cell. Yet cells may grow and divide, life reproduces itself in a way not found in the mineral world.

Cells grow; a single nucleus gives rise to two by an intricate yet wonderful process of division, and thus there arises the possibility of growth, maturity, death and rebirth in endless cycle. The cell serves as the brick, the unit-form, as does the atom in the previous kingdom and from it the plant structure is built, by aggregations of cells often modified in shape and function, yet in essential nature the same. The plant form, composed of a myriad cells, is fixed at its central point, whence it strikes upwards as shoot to air and light, downwards as root towards earth and water; a fixed form dependent on the immediate surroundings for experience, yet responsive to changes in

Growth and
Change

the pulsing rhythm of life. Growth and change are added to the previous qualities of stability and inertia, as life begins to free itself and flows back and forth in response to the cyclic laws of nature. So, with increased responsiveness to both interior life and external surroundings, the second stage on the upward path is reached. So marked is the change when life becomes even in this small degree free within its form that many scientists still

think of the living and the lifeless universe, and do not include the mineral world in a single scheme with all the living organisms of the plant and animal kingdoms. It is, however, in this very problem of the differences between kingdoms, and especially the first two, that the concept of evolutionary cycles is of value in co-ordinating our knowledge.

Taking a vast jump, for our process is only a brief survey, we view the next, the animal world. The forward drive of the Life evokes a more complex form, since those of the previous kingdoms have become inadequate to express its newly unfolding powers. From a mobile cell the animal body is evolved, a form more sensitive and delicate in its balance than any that have gone before. This new structure is built on the basis of the old. In the bony skeleton animal forms possess a stable interior core of mineral constitution. This is surrounded by the changing and rhythmically beating circulatory and respiratory systems controlled by

**The Animal
Kingdom**

heart and lungs, the fluidic systems of the animal body based on the form of the plant. Always we may find, if we look, these traces of the passage through earlier

cycles, often so distinct as to afford a startling correspondence, as is evident to anyone who will study pictures of the skeleton framework of animals, or anatomical diagrams of the fluidic and respiratory systems of the body. In addition to these gifts from the past, and almost appearing as though grafted on to the vegetative system of the plant form, we find in the animal the brain and nervous system. It is this which is the

**The Brain and the
Nervous System**

special organ of the animal form. In the brain we have a controlling organ through which the life-energy receives external impressions and transmits its commands, via

the nervous system, to the various parts of the body, which in their turn express that energy in action. As a result the animal is freer still in his environment; not only does he respond to it but moves within it. He is no longer fixed at a point like the plant, with only a brief linear extension, but moves freely over a two-dimensional world. Impacts of the environment, in their turn, travel through the nervous system to the brain and hence to the interior life, and are perceived in terms of feeling and sensation. Pleasure and pain are born and appropriate responses made. In the animal world, life is at last free to some extent to choose its environment and move about within it under the alterations of the sensations of pleasure and pain. Life adds sensation and feeling to its

unfolded powers. It is in this kingdom of nature that the interplay between life as it manifests in form and the pressure of the surrounding environment sets up a friction which leads gradually to the awakening of consciousness and a realization of self as distinct from other selves. Beginning in the animal kingdom, in the more highly developed domestic animals, we find the dawning of mind. Self-consciousness is gradually born with its sense of individuality, the consciousness that "I am I, and you are you", begins with the higher animals and is finally completed in the human world. The evolution of clearly defined awareness is only possible through the delicate organization of the brain and sensory nervous system, built to serve the ever-increasing needs of developing life.

Mineral, plant and animal, three kingdoms are needed before self-consciousness is born and life at last turns and regards *itself*—begins to realize itself again and shake off the shackles of form. So striking is the change when this occurs that it is often referred to as a new birth, an individualization, a recurrence of a major cycle, superposed on the lesser ones. Just as complete subordination of life to form at the beginning of the evolutionary journey formed a starting-point of a cycle, so this self-realization of life marks the completion of a major phase. The self-conscious individual in the human kingdom is said to have a spark of divinity not possessed by the life in the earlier ones.¹ Man is unique by virtue of his mind which gives him self-knowledge and self-consciousness.

Up to this point in tracing the evolutionary journey, we have looked at the established facts of science in the light of our theosophical hypothesis or principle of evolution. In one sense, here we reach the end of our field, passing from the realm of biology to that of psychology and the human sciences. Here we must leave our subject, with perhaps a brief reference to the future trend of this great evolutionary process.

Life, after long experiences in animal forms from the simple to the complex, finally attains to a sense of individuality as its supreme achievement and so passes into the human kingdom, where although mankind represents the climax of one evolutionary wave, he still has much

¹ Diagram 7 in the monograph on "Chemistry" brings out clearly the fundamental difference in constitution between the human kingdom on the one hand and the mineral, plant and animal kingdoms on the other.—Ed.

to achieve. Having been for a shorter time on earth, he is in many ways less unfolded as an evolving kingdom, or hierarchy, than the ones which came before. Mankind is still struggling to pass from the stage of animal-man to the truly human stage of man the thinker. He is still largely bound by the feelings and sensations of the animal stage and has not learned to harness these by creative thought and will. What will be the unit which will express the powers of the thinking human being? Just as previous kingdoms established their units, so there is a unit-form to express the powers of the human hierarchy: the organized instrument of personal

The Human
Personality

body, emotions and mind, a threefold form, the personality of man. A real turn of the cycle takes place in man, who when fully developed works through a larger

and more subtle unit than the three kingdoms before. If for a moment we look back over the journey from mineral to animal, we may see the gradual organization of certain qualities of vitality and emotions, or feeling, to which the human kingdom adds the power of mind. We, as true humanity, have to build these into a whole as an expression for our interior life, a whole in which body, emotions and mind, the three qualities of personality, are used as co-ordinated instruments to express something that is the life of man, working through them all. When we truly know ourselves as Spirit, this unit will become for us a tool through which we work. From mineral to plant, animal to man, we have shown the increasing organization of form to suit the needs of evolving life. Life once held in form returns to a sense of its own powers and yet with the quality of individuality, of self-awareness, that has been termed "the pearl of great price".

Science may ask wherein lies the evidence for this interior field of increasingly organized life, and here is a field for future research. If life becomes individually self-aware, then some sense of separation from the ocean of life must be found in the life-current itself. As the evolutionary

Group-Souls

process proceeds reservoirs of experience, or "group-souls", smaller vessels within the life-current, tend to be developed and act as envelopes which carry the accumulated experience of a group of species of forms manifesting at the physical level.

This concept of organization of groups of life-units associated with specific groups of forms, was employed by Maeterlinck to explain the social life of bees. In *The Spirit of the Hive*

he shows how the only adequate explanation which will cover all the

The Social Life
of Bees

manifold activities of a single hive of bees is that there is a group-soul, or organized group-consciousness, expressing itself through the individual bees.

This theory, so apt in this instance, might well be extended to explain other types of animal behaviour, such as why one species tends to act in a given way, why certain instincts are transmitted in a given species and not in others. Animal instinct and memory show characteristics difficult to interpret without some such theory of a group-reservoir of life forming the common background of a number of forms of a related species. With more developed animals characterized by greater complexity, and often showing marked differences of character in individual members of a species, there are probably only a few forms linked to such an interior group-soul. In the lower types, and the idea may be extended to include plant and mineral forms, there may be many thousands of forms storing their experience in a common reservoir of life. Since such group-souls lie within the greater ocean of life, and there is, until the domestic animals are reached, little or no development of conscious thought, the response of

Response largely
instinctual

plant and animal to environmental stimulus will be largely instinctual. Insofar as different types and species have, by different experiences in form, created different organized group-souls, there will tend to be differences in the behaviour shown by the different types. As variety in experience tends to cause a separation in the group-soul, we get ever fewer types associated with the one reservoir until in man we find one single form with a life-reservoir of all his cumulative past experience behind him. The time may have come for an attempt to apply this theory to some of the problems of biology, such as variation and heredity and the way in which natural selection works as well as the problems of animal instinct and group behaviour. It is at the interior level of the increasingly organized life that a solution will be found, and not merely in an analysis into ever more complex groups of factors at the physical level, the so-called "genes". Important though these are they cannot give the whole picture. As expressed by a recent writer in *Nature*:

It seems clear that the final systematics must be biological, based on the whole life of the animal rather than on the average structure of its adult body.

In conclusion, it is the unity of the whole scheme which is so significant. From mineral to man the interweaving currents of life and form are manifestations of a single whole. We are said to be at the

dawning of a new era, when mind is to be transcended as our means of experience by the direct apprehension of the intuitional principle. Mind sees life and form as two separate interweaving currents, but what may lie beyond? A unity which transcends both life and form, space and time, and in which both co-exist as aspects of one reality. This unity, glimpsed by seer and scientist alike, has been expressed by one of our leading scientists, Sir James Jeans:

A Unity trans-
cending both Life
and Form

When we view ourselves in space and time we are quite obviously distinct individuals, when we pass beyond space and time we may perhaps form ingredients of a continuous stream of life.

And a zoologist, M. M. Metcalf of the John Hopkins University, writes:

A star is no greater than a violet; gravitation as a force cannot transcend love, for Love seems incomparably more effective, more forceful than any physical force, lying as it does at the very root of the universe. But it is all one, beginning in the dust and reaching up into persons who can appreciate and create beauty and feel love—a constantly changing whole, alive, personal.

The world has greater need of this experience of the unity of all that lives than any number of laws and facts, for the next advance must come from a more universal realization of that life in which all things live and move and have their being.

An Experience of
that Unity

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WHITHER SCIENCE ?

BY IWAN A. HAWLICZEK

The Purpose of the Monograph THE word "Science" may conveniently be used to describe the methodical efforts of man to gain an understanding of the world in which he lives. It should not be reserved exclusively for the work of modern times. Since man, the investigator, is himself an evolving being, it follows that the manner of his research will change with the course of his own unfoldment. It is the purpose of this monograph to review briefly some of the changes which have already taken place in the past, and have prepared the way for science in its modern form, and then, by a process akin to mathematical extrapolation, to attempt to outline the direction in which scientific research is likely to proceed in the future. Obviously, in a matter of this sort, only general principles can be given, so that the lay reader need not fear that he will be carried out of his depth in technicalities.

The Psychological Age of Humanity Fundamentally the problem is a psychological one, since man is himself a psychological being. Both the objective of his experiments and the methods which he employs at any given period of history depend upon the "psychological age" of humanity at that time. The conquests and achievements of the past, as they have been won through millennia of struggle during the slow progress of racial evolution, are summarized and recapitulated in terms of psychological growth and faculty in the life of every individual as he passes from infancy to maturity. This gives a valuable clue to the early evolution of man, serving to draw together and corroborate the scattered evidence of historical or semi-historical records. The observable phases of individual growth are, perceptive, active, emotional (puberty), mental analysis and criticism, often destructive (later adolescence), followed by an associative or synthetic mental stage when maturity arrives. These last three correspond to the Lemurian (Negroid), the Atlantean (Mongoloid)

and the Indo-European (Aryan) races respectively. Today one can perceive the emergence of a new psychological level to which the name of "intuition" is being applied.

Two Aspects of
Research

Research itself has two aspects. There is, firstly, the self-conscious level of the investigator as briefly noted above, and, secondly, the faculty or instrument of consciousness which he employs for the purposes of research. The former represents the psychological level of evolution to which he has attained, and the latter is usually one stage lower, being that of his most recent self-conquest. The child at the active stage, for example, is master of his perceptive faculties; at puberty he dominates his capacity for action, being able to walk, run, play, speak, etc. with complete freedom. During adolescence he can use emotion as an instrument of self-expression, and on reaching maturity he is master of the processes of thought. Translating this back into terms of racial history, and omitting the very earliest races of which no external trace now remains save in the realms of mythology, it can be shown that in the days of Lemurian splendour the self-conscious level of the investigator was emotional, and hence activity, the most recently conquered faculty, was available as his instrument of research. Progress in Atlantean times brought humanity one step forward. The emotions had now been objectified in large measure, so that feeling became a faculty or instrument of consciousness which the investigator could use, while the level of his own self-consciousness had risen to that of mental analysis. When the Indo-European peoples reached maturity, with the birth rather more than a century ago of "modern" science, analysis reached the stage of being a faculty, and mental synthesis became the self-conscious level of the investigator.

Faculty and
Apparatus

It will be observed that a distinction is being drawn between the "instrument" of research, *i.e.* the faculty or faculties of consciousness which the investigator employs in his experimental work, and any "apparatus" which he may devise for extending the range of his perceptive or muscular powers (*e.g.*, telescope, microscope, chemical balance, etc.).

There is a certain difficulty in describing the "science" of the Lemurians since there are practically no pure remnants of this race left. The present day Negroids have a considerable infusion of Atlantean blood. One must rely mainly on fragmentary evidence such as is provided by the discoveries relating to primitive man, on the one hand, together

with a study of child psychology on the other hand. This can, however, be corroborated and supplemented by the researches of competent occultists such as H. P. Blavatsky, Annie Besant and C. W. Leadbeater (see *The Secret Doctrine, Man: Whence, How and Whither*, etc.). While the average scientist may not be prepared to admit this last source as evidential, nevertheless a number of statements derived in this way have subsequently been proved correct by scientific methods recognized as valid. However, the writer does not wish to invest this means of research with scientific authority, it being sufficient for the purpose to indicate it as a source of corroborative evidence, and a possibly useful hint with regard to the future.

Corroborative
Evidence

Taking, then, these various sources into consideration, it seems clear that the scientific research of the Lemurians lay chiefly in the realms of action, consisting of experiments in cooking, building huts, villages and defences, adapting caves for habitation, fashioning primitive weapons, pottery and ornaments, a restricted use of colour for decorative purposes, and, to a minor extent, the cultivation of the soil. In a word, it was confined almost exclusively to the problems of maintaining physical life in growing security and comfort. Thus was the science of action made to serve the emotion of safety and happiness. Those active factors which contributed to a feeling of expansiveness and well-being were welcomed while those which made for misery or frustration were avoided. Memory, in the sense of foresight and provision for the future, seems to have been largely in abeyance, for memory belongs to the mind level of consciousness, with its power to look backwards and forwards. The Lemurian, like all emotional people, lived in the present, with but hazy notions of past and future.

Memory in
Abeyance

Atlantean science was a very different affair because the approach to experience was from another angle. By this time the level of self-consciousness had risen into the analytical mind, and therefore the emotions became the principal instrument of research. For those who have undergone scientific training today it is by no means easy to realize what science meant to the Atlantean investigator, even with the help of an analogous period in the Middle Ages. There was, for example, neither chemistry nor astronomy as these are understood today, their place being taken by alchemy and astrology.

The Atlantean
Science

Science then contained a strong mystical element which is lacking in its 19th century descendant but which to some extent has reappeared in modern times. By the Atlanteans the whole of Nature was regarded as a living organism. Her phenomena were due to the activities of intelligent beings, and not to the operation of impersonal "laws" working like a soul-less mechanism. It was therefore necessary to invoke or placate these beings by the use of appropriate ceremonial or magic. The Atlantean probed life through feeling and not by thought. He used his faculty of sympathy to establish contact with the objects around him and thus gained some realization of their essential nature. This method is feebly reproduced in modern times by the magnetic *rapport* established by psychics and mediums. This kind of psychism is not to be confused with the seership of a trained occultist, whose methods are very different, being anticipatory of a future age.

The Atlantean
probed Life
through Feeling

The information gained in this affective manner passed into the analytical self-consciousness of the Atlantean, being laid side by side with other experiences of a similar character. By means of the phenomenal memory for detail which is characteristic of this stage, and which survives among the Chinese, these experiences were classified and worked up into a number of abstract analytical concepts regarding the universe.

Phenomenal
Memory

This is in sharp contrast to the methods of the scientific age of the 19th and early 20th centuries, and necessarily so because the progress of racial evolution has once again raised the level both of self-consciousness and of its instrument of research. The self-conscious level of the investigator has now reached the synthetic mind, and analysis has become the instrument of research. It is the peculiar faculty of this instrument to examine details with minute care. The earlier mysticism has been swept away and the modern scientist has become a worshipper of cold facts. To be scientific in the modern sense implies strict accuracy, meticulous care, and painstaking exactitude in the detailed examination of phenomena.

Characteristics of
a Scientist

It is not enough to know about things in general terms. The limits set by the ordinary sensory-mechanism are entirely inadequate, hence apparatus of increasing delicacy and discriminative power is constantly being devised, so that facts may be known with greater precision. Thus is exhibited a true analytical mind passion for detail. The feelings, once so important, a factor in

research, are definitely regarded as a hindrance, and must be eliminated as far as possible. The modern scientist must be cold and dispassionate in research. He may not use his "feelings". The personal equation must be reduced to a minimum. Whereas Lemurian science sought to make life happy, today it is no longer important if a discovery be pleasant or otherwise, whether it contributes to the increase or diminution of human happiness. The pursuit of knowledge for its own sake is the scientific ideal of the times.

Pursuit of
Knowledge for its
own Sake

The vast array of facts thus accumulated is classified and then marshalled before the bar of the synthetic mind, whose function it is to assemble these classifications and deduce from them some fundamental principle, which is then enunciated as a "law of nature". Such a law is not the decree of an omnipotent Being. It is man's attempt to explain the nature and relationship of a collection of observed phenomena. As such it is liable to constant revision in the light of further knowledge. Facts need not conform to the "law" but, on the contrary, the law must be fitted to the facts. In other words the work accomplished by self-consciousness at the level of the synthetic mind is the discovery of principles or formative forces.

The Synthetic
Mind

The Discovery
of Principles

While this serves admirably for the present phase of human evolution it will be as transient as the former modes have proved themselves to be. Science will change in the future as fundamentally as it has done in the past. Indeed, it already shows indications of such a change. It will therefore be appropriate at this point to attempt an evolutionary extrapolation, and forecast the probable tendency of research in the future. The first result of such an attempt will doubtless come as a profound surprise to the scientist of today. His passion for facts had already been noted but, scientifically speaking, facts in the future are likely to become just as important to research as feelings are today.

The Probable Tendency
of Research
in the Future

Having already crossed the threshold of a new age, it is becoming increasingly clear that a new layer of self-consciousness has begun to emerge. It is still very much in its infancy and may require some centuries to reach a degree of maturity which will entitle it to be regarded as scientific,

This new level of consciousness is being called intuition. There are two elements in its composition. On the one hand it possesses certain qualities akin to the emotions which have caused Prof. Bergson to describe it as an "overtone of the emotions". On the other hand there is also an ingredient of intellectual understanding. These two elements have been neatly combined, also by Prof. Bergson, in the descriptive phrase "intellectual sympathy". Many attempts have been made to define intuition, but at this early stage of its irruption into the field of normal self-consciousness there is no adequate language in which to express its real nature. There is no doubt that intuition differs considerably from the mind in nature, methods and technique. Certain of these differences can be indicated with some degree of clearness.

Being essentially an instrument for examining phenomena in an objective manner, the mind is fundamentally dualistic. There is a clear distinction between subject and object, between the examiner and the object of his regard. Intuition, on the other hand, knows no such distinction. Its method is to enter into union with the object (*cf.* the etymology of *in-tuition*) which then ceases to be an "object". It becomes instead part of the conscious life of the investigator, a mode of his self-realization.

From mental dualism it seems impossible to escape. The moment any sort of mystical or interior experience of consciousness enters the mental field it ceases to be regarded as scientific. And yet there is a mysticism of knowledge as well as one of feeling, and it is just this kind of reality which the word intuition seeks to designate. In the new age, therefore, a new method of discovery by "interior knowledge" should gradually become available. The investigator will then no longer be limited to that which can be ascertained by an objective examination of phenomena—appearances are notoriously deceptive, even in the scientific world. By his intellectual sympathy he may be expected to extend his own self-consciousness to include such phenomena, thereby uniting himself with the life or force which is their main cause. If there be any truth at all in the theosophical doctrine of the One Life, of that which the Hindu philosopher calls "The One without a second", then it must surely mean that the causes of all that is in the world we see around us are to be found in the inner life of man himself, even though they may also be discoverable in

the world outside. "The One without a second" disposes of all dualism. There can be no division between self and not-self, but only a distinction. That distinction is *māyā*, illusion, and it is the aim of science to dispel illusion by discovering reality.

The foregoing represents a distinct goal to be realized probably only by those in whom the buddhic consciousness is fully active. The early beginnings of this will not normally be available to man until the Sixth Root Race has reached maturity. Its full splendour will only be evident when human life has reached the closing stages of the Sixth Round. All that the Aryan or the Fifth Root Race (of this Fourth Round) can be expected to achieve is a preliminary opening up of the mind to receive illumination from a higher world, somewhat after the manner in which an attic chamber can be flooded with sunshine by uncovering a skylight in the roof. Nevertheless even this will mark a very considerable advance.

At present the mind is illumined only by windows round its sides. These are the five senses through which the observer looks out upon the phenomenal world. The occurrences he uses are his facts, only such information as comes through these channels being recognized as factual. All else is speculation, which may appear useful or fantastic according to the nature of the individual.

The immediate next stage is likely to be the admission to the factual realm of information received into the mind through the skylight of intuition. This would constitute the mysticism of knowledge already mentioned. In this stage the synthetic mind still remains the central pivot of life, and knowledge will continue to be brought before the bar of intellect, before it is accepted as truth. Of this there are already many known instances. Scientists, such as Einstein, have made an intuitive leap in the dark, and have put forward certain ideas, and have mentioned the "facts" which would prove them true. It has taken years of subsequent research and experiment to discover these facts by ordinary scientific methods.

As this mode of self-consciousness grows it will gradually objectify the synthetic mind and convert it into an instrument of research. When this happens another scientific revolution will have occurred. The synthetic mind is not concerned with the collection of facts. Its work lies in the field of ideas, in the realm of archetypes whence facts and phenomena are derived. Research, therefore, will most likely be in

The Mysticism of
Knowledge

The Synthetic Mind
an Instrument of
Research

the direction of understanding the formative forces of the world which, incidentally, are responsible for producing facts already known, but which can equally well be made to create new facts to suit their requirements. To create the facts necessary to establish truth sounds like rank scientific heresy. But the heretical notions of one age sometimes lead to the truths of a later epoch. These intimately known forces of the mind we may expect to see gathered up into a self-conscious intuition, where they will be recognized as modes of manifestation of the One Life in which all things live and move and have their being.

That day, indeed, would seem to be nearer at hand than one might suppose. Already an interesting controversy is current among some of the leading scientists concerning the nature of knowledge itself, and ways whereby it can be obtained—legitimate or otherwise according to the point of view adopted.

Dr. Dingle and others maintain that scientific progress and a knowledge of nature must be based upon the observation of facts. Prof. Milne and his colleagues, on the other hand, are of the opinion that "theorems exist in their own right", whether or not they correspond to structures in nature.¹ This is a distinct blow to the worshipper of facts above all else. Milne's "Cosmological Principle" would, indeed, appear to be an adumbration of the day when science will place major emphasis upon the study of principles, while facts will assume the secondary place of adjuncts to these principles.

These ideas are by no means easy to understand, but the science of medicine offers a partial analogy which may assist in comprehending this condition of affairs. The doctor fixes his attention chiefly on what his medicine can *do* (i.e., its potency); the *fact* that it may be pink or green, sweet or bitter, pleasant or nauseating, solid, liquid or gaseous may be interesting but it is unimportant. It may be desirable to disguise a nauseating flavour by "creating" a new taste, but this is entirely a secondary consideration. It is the potency that matters. Even so will facts take a second place in the future science, and potencies will occupy the position of major importance.

¹ *Nature*, 8th May 1937, p. 784, and 12th June, 1937, pp. 997-1012.

It may be argued that the potency of a medicine is also a fact, and that the doctor merely discriminates between one set of facts which he considers important and another set to which he need not pay particular attention. But this is only partially true, for it is well known that patients react differently to the same treatment, and it is by no means a fact that a given medicine will always produce a specific result. The most that can be claimed for it is a potency in some special direction, the precise effect of which will depend upon a number of other factors individual to the patient. Hence the analogy, though far from satisfactory, may serve as a suggestion.

Even that will not be the end, for the process of evolution is continually opening up fresh vistas and new faculties, but as much has been said with regard to the more immediate future as is reasonably possible in the light of our present knowledge. Indeed even this might be too much were it not that the science of the future exists already in our own day under the name of occultism. Through the scientific practice of certain types of meditation it is possible to achieve that fusion of consciousness between self and the forces of the universe which makes observer and object temporarily one. It is beyond the scope of this monograph to show how the occultism of one age has become the science of a succeeding era, but the fact that this has been so in the past leads one to expect its probable repetition in the future.

Each age develops its own technique. There are many to pursue the orthodox technique of modern times, but there must needs also be a few whose eyes are looking to the future. It is the earnest hope of the writer that some of these will, both by theory and experiment, challenge the hypothesis put forward above, either overthrowing, modifying or conforming it, so that in due course the foundations of the true technique of the future may be laid. Humanity is not the most advanced kingdom of nature in existence. As the plant is the stepping-stone towards the animal; as the animal is a prelude to man; so is man but a stage on the road to superman.

There are already those in existence who have crossed the human stage and have entered the realms of consciousness which lie beyond. They are called the "Men beyond Mankind", the "Masters of the Wisdom", for They are masters of the true science of life. They reveal the way, step

Occultism—the
Science of the Future

A New Technique
for a New Age

"Men beyond
Mankind"

by step, that man has yet to tread until he can cross the threshold of divinity. There are always a few among mankind who, not content with living at the average level of their fellows, are imbued with the spirit of pioneer exploration, seeking to open up the road of future human progress. Such people address themselves to the task of research into the inner recesses of their own consciousness, and, by their strict discipline of life under competent guidance, they bring out new faculties from latency to power. This is the process known as *yoga*.

The Spirit of
Pioneer
Exploration

And so the occultist of one age opens the road for the scientist who follows him. The former finds faculties in his own consciousness; the latter discovers the identical forces in the world of nature around him, for there are not two worlds, the human and the natural, but only one world, and only one life within the infinite variety of differing forms.

Résumé. For purposes of quick comparison, the foregoing evolutionary sequence may be summarized in the following manner :

The Lemurian engaged in practical activity in order to discover the emotion of the universe. His quest was happiness ;

The Atlantean experienced the feeling of things in order to find the facts of the universe. His question was "What ?" ;

The Aryan examines facts in an endeavour to know the principles of the universe, his question being "How ?" ;

The future race will experiment with forces in an attempt to realize the life of the universe. His question will be "Why ?" .

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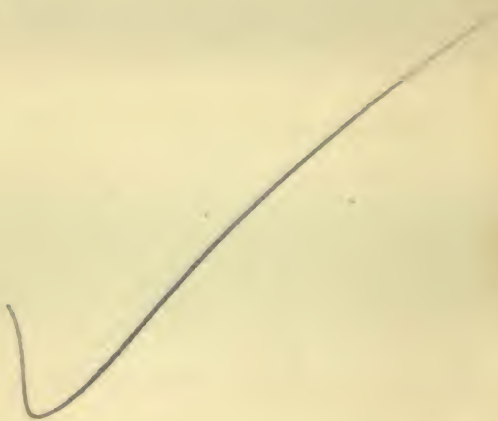
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